FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR THE UNITED STATES ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE

1. PROPOSED ACTION: The proposed action and subject of the Environmental Assessment is continuation of work at the United States Army Medical Research Institute of Chemical Defense (USAMRICD) under the direction of the United States Army Medical Research and Development Command (USAMRDC) (Alternative III). The USAMRICD is located in the Edgewood Area of Aberdeen Proving Ground (APG), Maryland. The activities of the USAMRICD do not support the development or use of chemical warfare munitions. The USAMRICD conducts work under the Department of Defense (DoD) Medical Chemical Defense Research Program (MCDRP) and the medical Biological Defense Research Program (BDRP). The USAMRICD conducts both basic and applied research in medical defense against chemical and biological agents. The activities conducted at the USAMRICD utilize chemical and biological toxins, some of which require the use of special containment facilities. The Environmental Assessment is tiered, in part, to the Biological Defense Research Program's Final Programmatic Environmental Impact Statement, April 1989 (Record of Decision, November 1989).

2. ALTERNATIVES CONSIDERED: Two alternatives are considered in addition to the proposed action. The first alternative evaluated is transferring the USAMRDC directed work at the USAMRICD to another location (Alternative I). This alternative would suspend the MCDRP and BDRP efforts performed at the USAMRICD and transfer these operations to other facilities. The second alternative (Alternative II, the No Action Alternative) is to cease work presently supported by the USAMRDC at the USAMRICD. This alternative would cease MCDRP and medical BDRP efforts performed at the USAMRICD. Alternative I and Alternative II do not offer significant advantages over the preferred alternative in terms of reduction of any significant adverse environmental effects. The USAMRDC programs conducted at the USAMRICD are authorized and funded by the U.S. Congress and implemented by the Department of the Army as lead agency for the DoD. These programs provide research, development, testing, and evaluation of materiel to protect U.S. forces from, and to treat casualties of, chemical agents and biological toxins.

3. ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES: Impacts discussed in the Environmental Assessment are not considered to have any significant adverse effects upon the quality of the environment. Significant adverse impacts on human health and the biota are not anticipated with continuation of normal operations, even in the unlikely event of a Maximum Credible Event (MCE) - a realistic, worst case, accident or incident. The environmental impacts from normal operations include the release of insignificant quantities of air and water pollutants at levels below permitted limits. Extensive procedural, engineering, and health/safety practices exist to ensure mitigation of potentially significant effects associated with normal operations. A major positive impact of the proposed action is the contribution of the research conducted at the USAMRICD to U.S. national defense.

Impacts associated with an MCE accident are not expected to be significant since the amount of chemical material and biological toxins used at the USAMRICD is extremely small. Concentrations of chemical materials and biological toxins released during an MCE are not expected to have any adverse impacts on terrestrial or aquatic biota and are well below the no-effect levels. No adverse impacts to human health are anticipated during an MCE. Significant non-mitigatable environmental effects are not identified for normal operations or for an MCE accident.

4. FACTORS CONSIDERED IN THE FINDING OF NO SIGNIFICANT IMPACT: The Environmental Assessment systematically reviews the nature of the activities conducted at the USAMRICD, the internal environment, the associated risks and issues, and the security and safety of operations. Particular attention is given to accident and emergency procedures as well as to special considerations associated with the operations of the USAMRICD.. The USAMRICD is then reviewed in considerable detail within the context of the surrounding environment and socioeconomic setting. Feasible alternatives with regard to needs of the United States and the U.S. Army and potential adverse effects on the environment are evaluated. Principal conclusions of the report are: (1) routine operation is safe and poses no significant threat to the environment; (V risks to the environment associated with accidental release of hazardous substances are extremely small; therefore, (3) continuing operation of the USAMRICD in its present scope will have no significant adverse environmental impact and will result in significant benefits to the U.S. Thus, the Environmental Assessment leads to a Finding of No Significant Impact.

RICHARD T. TRAVIS
Major General, MC
Commander, USAMRDC

DATE

Comments on this Finding of No Significant Impact may be directed to: Commander, USAMRICD, Colonel Charles G. Hurst, Medical Corps, Aberdeen Proving Ground, Maryland 21010-5425 (410 671-3276) and must be received by October 15, 1992. Copies of the Environmental Assessment are available for public review at the following locations: Harford County Public Library, Bel Air Branch, 100 Pennsylvania Ave., Bel Air, Maryland 21014; the Harford County Library, Edgewood Branch, 2205 Hanson Rd., Edgewood, Maryland 21040; the Pratt Library Maryland Department, 400 Cathedral St., Baltimore, Maryland 20201; and the Kent County Library 408 High St. Chestertown, Maryland 21620.

THE U.S. ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE

ENVIRONMENTAL ASSESSMENT (FINAL)

Prepared For

Headquarters
U.S. Army Medical Research and Development Command
Fort Detrick, Frederick, Maryland

Prepared By:
U.S. Army Medical Research Institute of Chemical Defense
Aberdeen Proving Ground, Maryland 21010-5425
with Technical Assistance from
Telemarc, Inc.
Fairfax, Virginia

Contract No. DAMDI7-91-D-1006

December 30, 1992

DEPARTMENT OF THE ARMY
U.S. Army Medical Research and Development Command
U.S. Army Medical Research Institute of Chemical Defense
Aberdeen Proving Ground, MD 21010-5425

ENVIRONMENTAL ASSESSMENT

December, 1992

Prepared by USAMRICD

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U.S. ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE

ENVIRONMENTAL ASSESSMENT (FINAL)

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Prepared By:
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December 30, 1992

EXECUTIVE SUMMARY

This Environmental Assessment, *The US. Army Medical Research Institute of Chemical Defense - Environmental Assessment (Draft)*, was researched and prepared by the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD) with technical assistance by Telemarc,, Inc., Fairfax, Virginia, under Contract DAMD17-91-D-1006 for the U.S. Army Medical Research and Development Command (USAMRDC).). The Army is the Department of Defense (DoD) Executive Agent for Chemical and Biological Defense research, development, test, and evaluation (RDT&E) (DoD Directive 51605). The USAMRDC performs as the DoD Executive Agent for medical chemical and medical biological defense RDT&E.. USAMRICD is a major subordinate activity of the USAMRDC and the lead medical research institute for medical countermeasures to chemical warfare agents. In addition, USAMRICD conducts research and supports development and testing of medical countermeasures to biological toxins.

This assessment was prepared in accordance with the guidance provided in Army Regulation 200-2 (32 CFR, Part 651), adheres to the requirements set forth- the National Environmental Policy Act (NEPA), and, where relevant, maximizes previous work accomplished during preparation of the Final Programmatic Environmental Impact Statement on the Biological Defense Research Program.

The assessment systematically reviewed the nature of the activities conducted at USAMRICD, the internal environment, the associated risks and issues, and the security and safety of operations. Particular attention was given to accident and emergency procedures as well as to proper hazardous waste disposal techniques associated with the operations of USAMRICD.

USAMRICD was reviewed in considerable detail within the context of the surrounding environment and socioeconomic setting. Feasible alternatives with regard to needs of the United States and the Army and potential adverse effects on the environment were evaluated.

The proposed action (preferred alternative) involves continued operation of USAMRICD in its present scope. The alternatives considered include ceasing the work presently supported by the USAMRDC (no action alternative) and transferring the USAMRDC-sponsored work conducted at USAMRICD to another location. The proposed action and alternatives considered were analyzed relative to the current and potential environmental consequences of routine operations. This environmental assessment determined that the proposed action (preferred alternative) has more positive attributes than the reasonable alternatives.

The principal conclusions of the report are: (1) routine operations of USAMRICD are safe and pose no significant threat to the environment; (2) risks to the environment associated with accidental release of dangerous substances or hazardous organisms are extremely small; and therefore (3) continued operation of USAMRICD in its present scope will have no significant adverse impact and will result in significant benefits to the United States.

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1.0 PURPOSE AND NEED FOR PROPOSED ACTION

1.1 Introduction

This Environmental Assessment (EA) evaluates the potential environmental impacts resulting from the continued operation of the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD) in the Edgewood Area of Aberdeen Proving Ground (APG), Maryland. The mission of the USAMRICD is to: (1) conduct research and support the development, testing, and evaluation of medical chemical defense materiel; (2) protect U.S. forces from, and treat casualties of, chemical agents; and (3) conduct research and development activities for the medical Biological Defense Research Program (BDRP) (U.S. Army Medical Research Institute of Chemical Defense, 1991). The work conducted at USAMRICD is administered under the Medical Chemical Defense Research Program (MCDRP) and the medical BDRP. Approximately 80 percent of USAMRICD efforts are performed under the MCDRP with the remainder devoted to the BDRP.

1.2 Purpose and Need for the Action

Pursuant to the National Environmental Policy Act (NEPA) (42 USC 4321-4347), each federal agency must give appropriate consideration to the potential environmental impact associated with its proposed major actions. The Council on Environmental Quality (CEQ), Executive Office of the President, has promulgated regulations implementing NEPA (40 CFR Parts 1500-1508). Army Regulation 200-2 (AR 200-2), Environmental Effects of Army Actions, dated 23 December, 1991 (32 CFR 651), is the Department of the Army's (DA) implementation of NEPA and CEQ regulations. This EA is prepared in compliance with the requirements of AR 200-2 and the EA's findings will be considered in the final decision on whether to continue operations at USAMRICD.

The U.S. Army proposes to continue the operation of USAMRICD at the current level of activity. The USAMRICD contributes to a strong national defense posture relative to chemical agents and biological toxins.

1.3 Assessment Methodology

To reduce redundancy with previous relevant documents and as required by the CEQ (40 CFR Parts 1500-1508), this EA is tiered to previous relevant documents. This approach entails referencing specific analyses, discussions, and conclusions of these documents without providing detailed discussions in the present report. However, the most relevant sections of these documents describing environmental consequences associated with operations of USAMRICD and risk/issue categories are incorporated into this EA. This approach is consistent with AR 200-2 (Section 2-6c) and the CEQ regulations [40 CFR Parts 1502.20, 1502.4(d), 1508.28(a)].

For tiering purposes, two classes of previous documents are relevant to the EA for USAMRICD. The first group of documents consists of EAs related to activities located or conducted at APG. The size, nature of use, and extensive history of APG as a military installation have resulted in the preparation of several NEPA documents. These documents provide site-specific information of the environmental setting of USAMRICD. The second classification of documents includes that material which has been previously evaluated in a DoD RDT&E programmatic sense. The BDRP was evaluated prior to the preparation of this EA. In 1989, the DoD prepared a Final Programmatic Environmental Impact Statement (FPEIS) on the environmental effects related to the BDRP (BDRP, 1989). The Record of Decision (ROD) concluded that no major negative environmental impacts existed. Those specific BDRP sites examined in the FPEIS were in compliance with applicable environmental standards, including local, state, and federal regulations and guidelines (BDRP, 1989). Various public and government groups were involved with the preparation and completion of the BDRP FPEIS. The resulting dialogues from these meetings and multidisciplinary, multidimensional analyses indicated that public concerns expressed at the local level were programmatic in nature and not directly related to specific sites within the BDRP. The FPEIS found that any adverse impacts associated with continuation of BDRP research efforts were minimal.

1.4 Description of the Proposed Action

The proposed action is continuance of operations at USAMRICD. The mission of USAMRICD includes:

(1) Fundamental and applied research directed towards the development of both protective measures against chemical agents and medical treatments for use by casualties of chemical agents (supports MCDRP).

(2) Fundamental and applied research directed towards the development of both protective measures against biological neurotoxins and new treatments for use by casualties of biological neurotoxins (supports BDRP).

(3) Maintenance of an information data base to help develop new methods for the prevention, treatment, resuscitation, and medical management of chemical casualties (supports MCDRP and BDRP).

2.0 DESCRIPTION OF THE U.S. ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE (USAMRICD)

2.1 Location and Facilities

The early predecessors of USAMRICD date back to the World War (WW) I Era. The Medical Research Division was organized at the Edgewood Arsenal (now the Edgewood Area of APG) in 1922 to study the pharmacological action of chemical agents and to develop treatment methods for chemical casualties. Renewed emphasis for prophylaxis and care of chemical casualties occurred prior to WWII and the Medical Research Laboratory was completed in 1942. Research increased after WWII in response to development activity for chemical agents by the Soviet Union. Medical defense efforts continued after WWII and Building E3100, the main USAMRICD building, was dedicated in 1968. USAMRICD became part of the Office of the Surgeon General (OTSG) and USAMRDC in 1979; USAMRDC is a field operating agency of the OTSG.

USAMRICD is currently a tenant activity of APG, Maryland, and a USAMRDC subordinate laboratory. The facilities complex occupies thirteen buildings (Buildings E2180, E3081, E3100, E3101, E3103, E3104, E3105, E3156, E3221, E3244, E5179, E5244, and E5826) within the Edgewood Area of APG. Table 2-1 provides the size and age of each USAMRICD building. Laboratory operations are conducted in Buildings E3081, E3100, and E3244. The number of laboratories located in these buildings is also found in Table 2-1. The remainder of the facilities complex houses administrative, support, and training activities. The general location of APG is provided in Figure 2-1, and the location of USAMRICD within APG is given in Figure 2-2.

The Edgewood Area is adjacent to the community of Edgewood in Harford County, Maryland, 21 miles northeast of Baltimore. Geographically, the Edgewood Area is a peninsula bordered on the south by the Chesapeake Bay, on the north by Harford County, on the west by the Gunpowder River and on the east by the Bush River. This peninsula, called Gunpowder Neck, is the largest portion of the Edgewood Area comprising 13,000 acres. Carroll Island (855 acres) and Grace's Quarters (476 acres) are on the southwestern boundary of the Edgewood Area (see Section 4.0).

As a tenant of APG, USAMRICD must comply with the regulations and guidelines of APG and the U.S. Army in addition to the regulatory requirements of the state and federal governments. Applications and permits required of USAMRICD by state, local, and federal agencies are filed and held by the administrative entity of APG, the APG Support Activity (APGSA). In addition, APGSA assumes responsibility for maintaining USAMRICD facilities and any improvements or changes to the buildings occupied by USAMRICD must be approved by APGSA. APGSA maintains responsibility for USAMRICD utilities (see Section 4.1.9) and water (including wastewater treatment) (see Section 4.1.4) as well as solid and hazardous waste disposal activities (see Sections 25.1 and 2.5.3).

Table 2-1 Characteristics of USAMRICD Buildings (data from Casole, 1992a, 1992b)

Building	Building Size (square feet)	Number of Laboratories	Age (years)
E2180	6,220	0	51
E3081	67,000	30	13
E3100	76,490	77	23
E3101	4,000	0	7
E3103	3,200	0	3
E3104	4,800	0	1
E3105	2,400	0	1
E3156	6,800	0	35
E3221	400	0	1
E3244	9,206	3	26
E5179	1,937	0	36
E5244	1,680	0	49
E5826	9,140	0	50

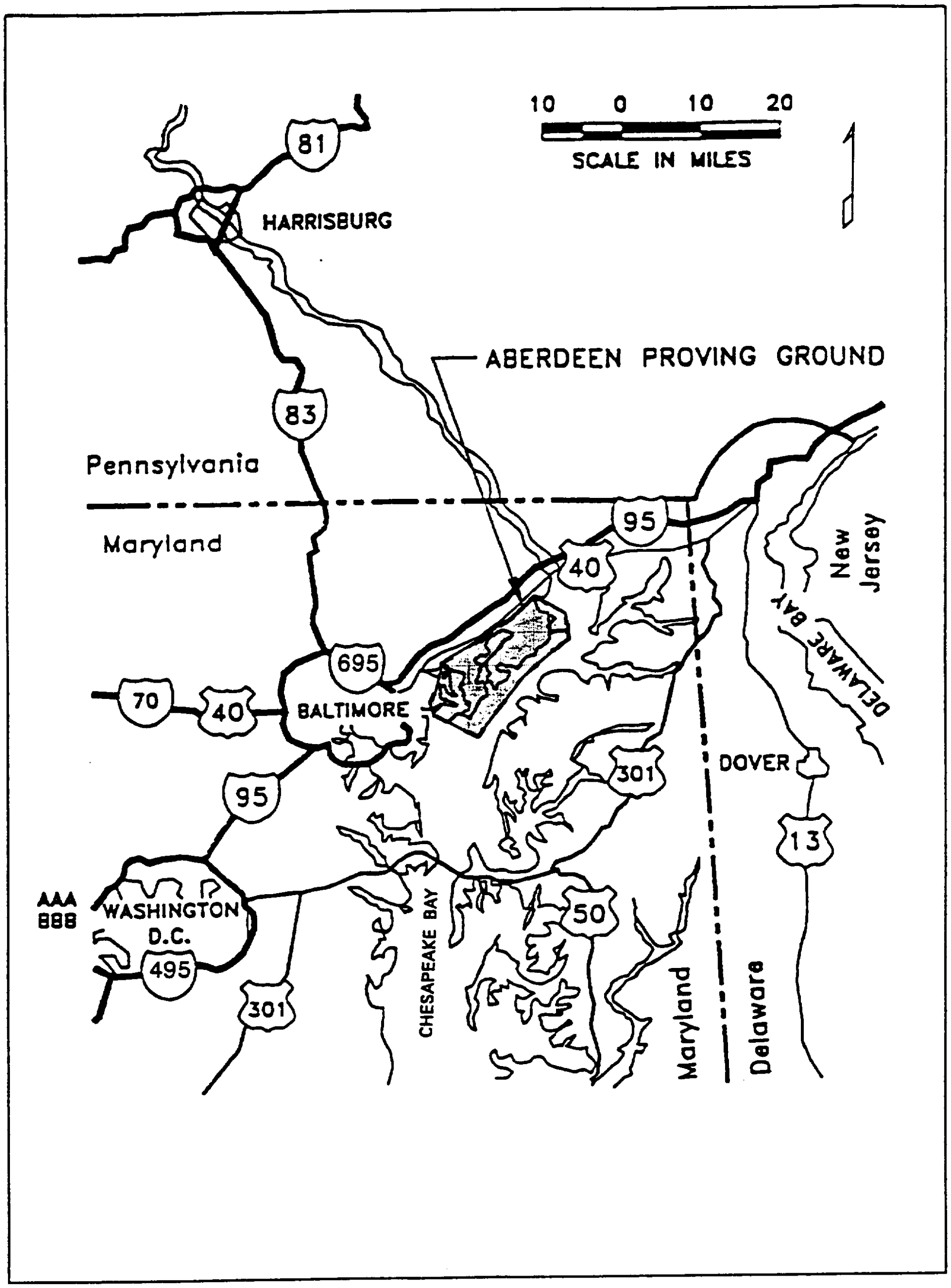

Figure 2-1 Location of Aberdeen Proving Ground, Maryland

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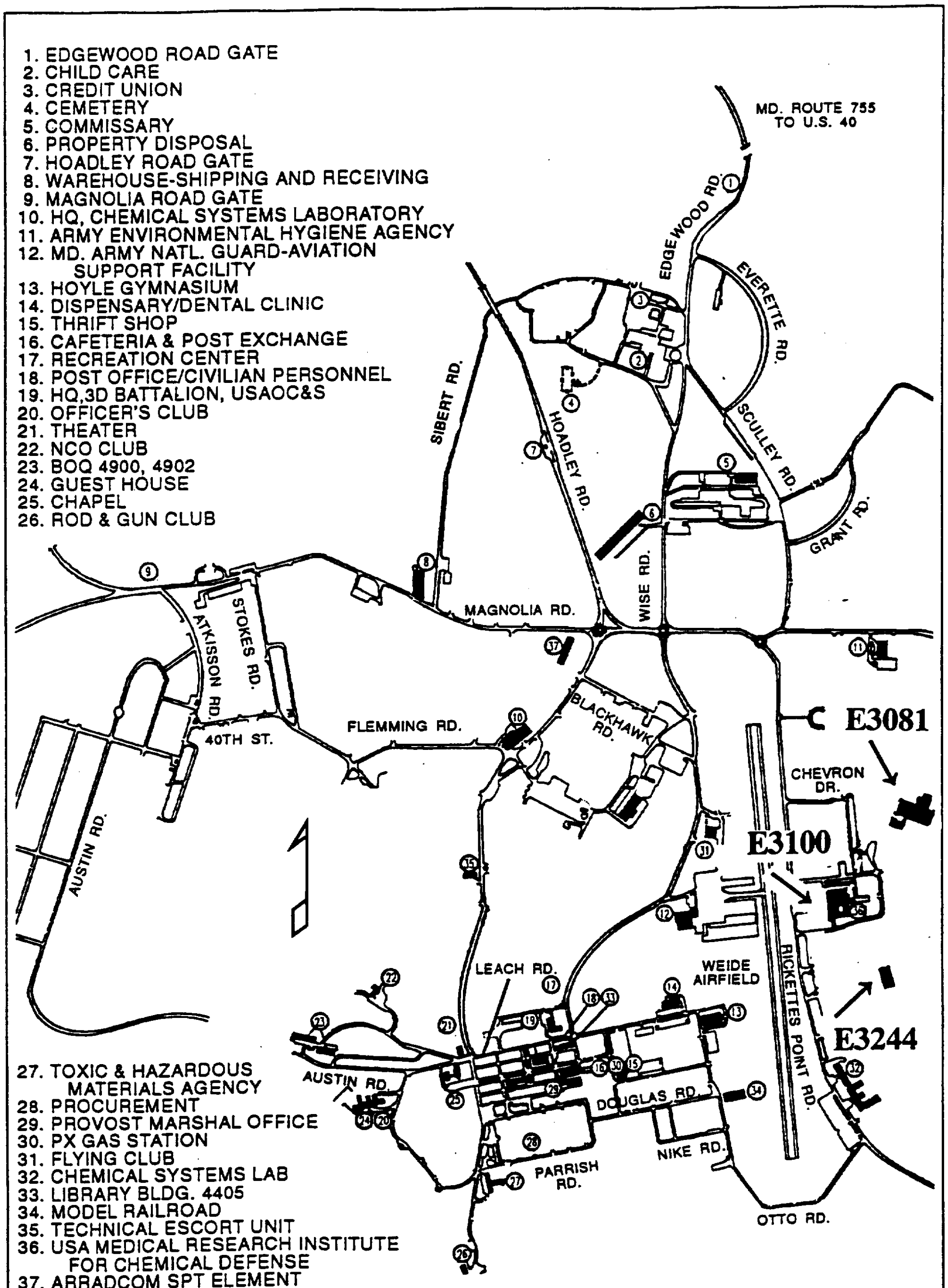

Figure 2-2 Location of USAMRICD within the Edgewood Area.

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The USAMRICD has a Support Agreement (Support Agreement Number W52H09-85162-202) with the U.S. Army Chemical and Biological Defense Agency (USACBDA). Under this agreement, the USACBDA provides specified services and support to USAMRICD in exchange for financial reimbursement. The services and support provided to USAMRICD by USACBDA include:

1) Automated data processing services.

2) Security guard support, intrusion detection system (IDS) testing, response, and monitoring (see Section 2.4.6).

3) Decontamination/impregnation (see Sections 2.4.1 and 25.2).

4) Radioactive waste pick up (see Section 2.5.5).

5) Safety (see Section 23) coordination of the Toxic Aid training, radiation protection committee membership (see Section 2.8).

6) Chemical Personnel Reliability Program (CPRP) drug testing (see Section 2.4.6) for civilian personnel.

7) Analytical chemistry services.

8) Command and control of the Chemical Accident/Incident Response and Assistance Center (CAIRAC) test exercises and emergencies as specified in the Surety Agreement which exists between APGSA and USACBDA (see Section 2.6).

9) Provision of Chemical Surety Materiel (CSM) and also all Army Materiel Command (AMC), U.S. Army Armament Munitions and Chemical Command (AMCCOM), and USACBDA Safety, Surety, and Security regulations and SOPs (see Sections 2.4.1 and 2.4.6).

10) Charcoal Adsorber and HEPA filter leak testing and inspection (see Sections 2.4.1 and 2.4.5).

11) Inspection, testing, and repair of protective masks and specialized clothing (see Section 2.4.1).

USACBDA also provides USAMRICD access to USACBDA technical library services, fabrication and repair shops, audio-visual services, and the USACBDA international program office.

2.2 Activities and Risk/Issue Categories

2.2.1 Activities and Purpose

USAMRICD is one of nine major research facilities of USAMRDC, Fort Detrick, Frederick, Maryland, and is the lead DoD laboratory for fundamental and applied research in medical defense against chemical agents. USAMRICD provides research and development support to the MCDRP and medical BDRP. The Institute also supports the development of informational resources in areas concerning the prevention and medical management of chemical casualties (U.S. Army Medical Research Institute of Chemical Defense, 1991).

USAMRICD conducts both basic and applied research. The goal of the research programs at USAMRICD is to develop a clearer understanding of the physiologic, pharmacologic, toxicologic, pathologic, and biochemical mechanisms of chemical and biological (toxin) agents and to develop specific pretreatment, prophylaxis, and/or antidotes. Research emphasizes medical materiel and informational countermeasures to prevent casualties, sustain mission performance, and facilitate casualty management. Activities undertaken to support this mission at USAMRICD involve analytical chemistry, neurobiology, cell and organ physiology, cell and organ biology, toxicology, experimental pharmacology, immunology, end veterinary medicine. Techniques involved include molecular modeling, cell culturing, and animal testing. The results of the scientific research performed at USAMRICD are published in the open scientific literature (Takafuji, 1991; U.S. Army Medical Research Institute of Chemical Defense, 1991). The activities of the USAMRICD do not support the development or use of chemical warfare munitions.

The operation of the USAMRICD is directed by the Office of the Commander. This office oversees the Chemical Casualty Care Office and six Divisions including: Administrative, Research Operations, Pathophysiology, Drug Assessment, Pharmacology, and Veterinary Medicine and Laboratory Resources (Figure 2-3). The missions of each of these Divisions as indicated in the Annual Report of the USAMRICD (U.S. Army Medical Research Institute of Chemical Defense, 1991) are described in the following sections.

2.2.1.1 Chemical Casualty Care Office

The Chemical Casualty Care Office (C3O) coordinates the functions of the intramural programs and various extramural entities (commands, agencies, organizations, and authorities) which are concerned with providing medical care for chemical casualties in both routine and field operations.

2 2.1.2 Drug Assessment Division

Through the use of *in vivo* (in intact living organisms) and *in vitro* (in isolated cells, tissues, or cell-free extracts) models, the Drug Assessment Division identifies compounds

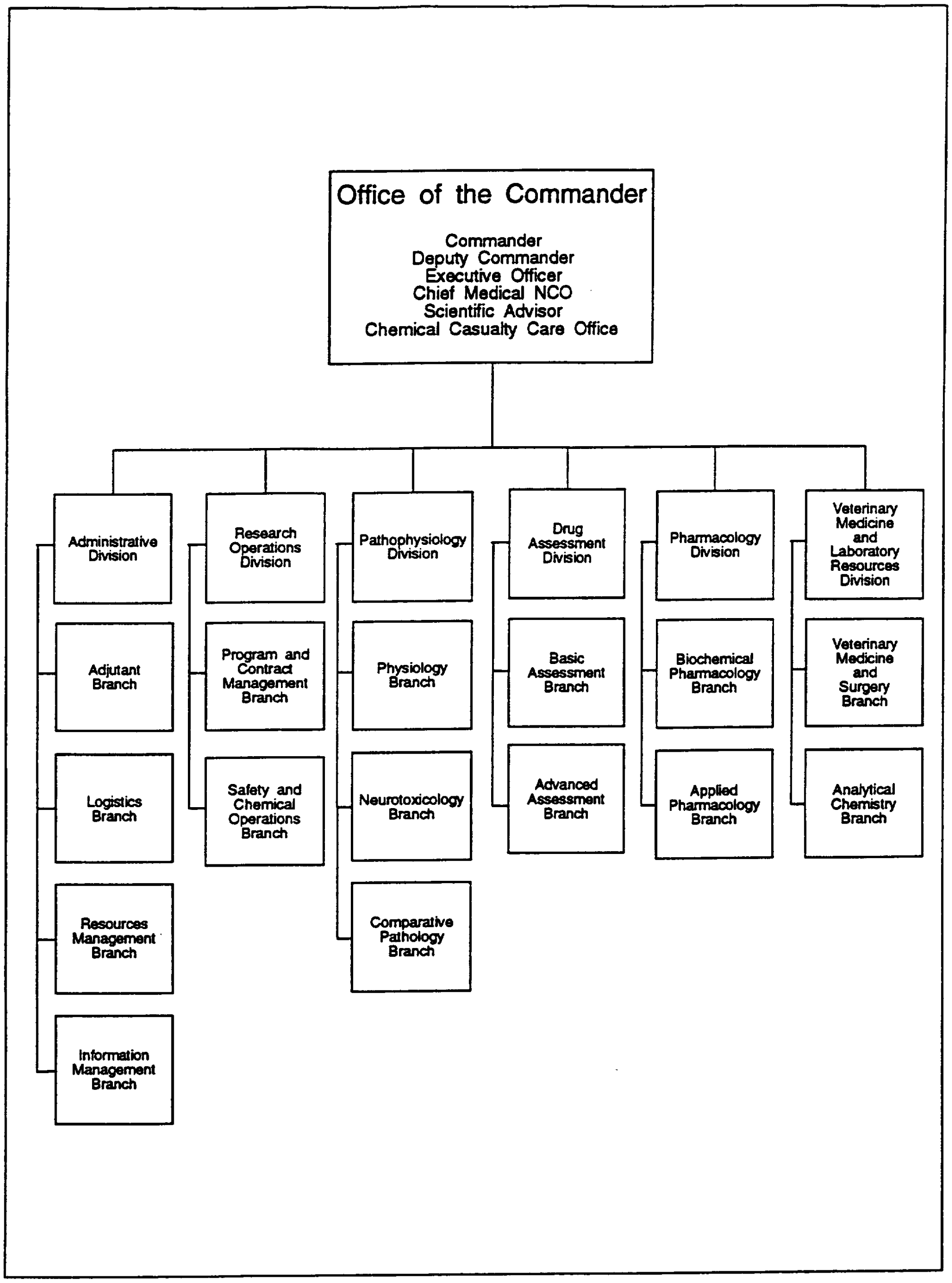

Figure 2-3 USAMRICD Organizational Chart

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which would be safe and effective for use in preventing and treating chemical agent injury. Compounds identified as having potential benefit are studied further prior to development. The Drug Assessment Division is composed of the Office of the Chief, the Advanced Assessment Branch, and the Basic Assessment Branch.

The Advanced Assessment Branch of the Drug Assessment Division develops and conducts experiments (both in vivo and in vitro) for evaluating compounds for the prevention and treatment of chemical agent injury. Compound evaluations are grouped into three categories: the toxic effects in mice, the toxic effects in guinea pigs, and the evaluation of the compound in nonhuman primates.

The Basic Assessment Branch of the Drug Assessment Division develops both in *vivo* and in vitro experimental protocols designed to discover and evaluate new compounds for defense against chemical agents. One laboratory of this Branch works with nerve agent treatments and pretreatments, another laboratory evaluates nerve agent antidotes in vitro models, and two laboratories investigate models (in vitro and in vivo for use in development of anti-vesicant therapies.

2.2.1.3 Pathophysiology Division

The research program of the Pathophysiology Division evaluates the mechanisms and effects (pathophysiology) of chemical and biological agents (principally, agents which act on the respiratory and nervous systems, and vesicants) and proposes treatment and prevention therapies. The Pathophysiology Division also provides technical monitoring and coordination of research contracts (23 in 1990) with academic institutions, government agencies, industry, and international organizations. The Pathophysiology Division is composed of the Office of the Chief, the Neurotoxicology Branch, the Physiology Branch, and the Comparative Pathology Branch.

2.2.1.4 Pharmacology Division

The Pharmacology Division performs both basic and applied research on the pharmacological mechanisms of potential therapeutic compounds. This division also helps determine the biochemical mechanisms of chemical agents. The Pharmacology Division is composed of the Office of the Chief, the Biochemical Pharmacology Branch, and Applied Pharmacology Branch.

2.2.1.5 Veterinary Medicine and Laboratory Resources Division

The Veterinary Medicine and Laboratory Resources Division provides laboratory research support, animal care, post-graduate training in laboratory animal medicine, review of experimental animal research protocols, and consultation in matters regarding the use and care of animals. The Veterinary Medicine and Laboratory Resources Division is composed of the Office of the Chief, the Veterinary Medicine and Surgery Branch, and the Analytical

Chemistry Branch. The Laboratory Animal Care and Use Committee (LACUC) and the facilities administration of the chemical exclusion area (BB Area) of Building E3081 are directed by the Veterinary Medicine and Laboratory Resources Division.

2.2.1.6 Research Operations Division

The Research Operations Division, which is composed of the Office of the Chief, the Program and Contract Management Branch, and the Safety and Chemical Operations Branch, is responsible for the comprehensive operational planning, safety, management oversight, and technical integration of assigned research as well as negotiated development and test programs for USAMRICD. The Research Operations Division is responsible for safety, surety materiel, radiation matters, environmental protection, operation of research programs, program evaluation, and research contract management.

2.2.1.7 Administrative Division

The Administrative Division coordinates the planning and control of many of the service and support activities necessary for execution of the overall mission of USAMRICD. Such activities include logistics, information management, adjutant and detachment activities, and resources. The Administrative Division is composed of the Office of the Chief, the Headquarters Detachment/Adjutant Branch, the Resources Management Branch, the Information Management Branch, and the Logistics Branch.

The Logistics Branch is responsible for both the acquisition and disposal of materials including hazardous substances. Logistics is also responsible for maintaining necessary engineering controls within USAMRICD and coordinating with APGSA on maintaining buildings and facilities. Logistics is also responsible for maintenance of medical equipment and for the calibration of equipment.

2.3 General Safety

Safety is an essential element in all activities of the USAMRICD. The USAMRICD Safety and Occupational Health Program is implemented by USAMRICD Memorandum Number 385-1 (Occupational Safety and Health Program). This memorandum implements all applicable federal, state, local, DoD, Headquarters Department of the Army (HQDA), and USAMRDC requirements, policies, and practices. All activities of a hazardous nature performed by either civilian or military personnel at work sites within USAMRICD fall under this program. USAMRICD policy makes compliance with the provisions of this memorandum mandatory for all civilian and military personnel at work within USAMRICD. Only Headquarters, USAMRDC, can grant exemption or waiver from the required safety regulations in accordance with applicable USAMRDC regulations. This safety program must provide workplace safety and health protection for employees and visitors as well as protection to the environment. It includes safety management and responsibilities, personnel training, personnel protective clothing and equipment, waste handling procedures, inspections, hazard communication, laboratory training, and several other program elements.

The Commander, USAMRICD, is responsible for maintaining the safety and occupational health program and assuring that it is in compliance with all applicable laws, regulations and policies. A listing of the laws, regulations, and policies relevant to USAMRICD Memorandum Number 385-1 is found in Appendix A. The Commander must also establish and monitor the USAMRICD Safety and Health Committee. This committee is composed of both supervisory and nonsupervisory personnel. The National Federation of Federal Employees (NFFE), which represents some USAMRICD non-supervisory personnel, may send a representative to Safety and Health Committee meetings (Casole,, 1992c).). A representative of the USAMRICD Safety Manager serves the committee in an advisory capacity. Minutes of Safety and Health Committee meetings are sent to the Safety Manager for review prior to routing to the Commander for review. The roles and responsibilities of the Safety and Occupational Health Manager, Executive Officer, Division Chiefs, and Branch Chiefs are outlined in USAMRICD Memorandum Number 385-1. Supervisors must comply with all applicable safety and occupational health standards and regulations and all relevant Standing Operating Procedures (SOPs).). A list of USAMRICD SOPs is located in Appendix B. SOP proponents must provide an annual review of the accuracy and adequacy of all safety procedures. This review is verified by the completion of USAMRICD Form 37 (see Appendix C). Employees must adhere to all safety standards, regulations, and procedures in the performance of their tasks and are encouraged to participate in the ongoing assessment and improvement of the safety program. Failure to comply with safety standards and regulations is cause for disciplinary action (USAMRICD Memorandum Number 385-1).

SOPs are required for all operations which are potentially hazardous such as work with chemicals, chemical agents, radioisotopes, or biological agents. USAMRICD Memorandum Number 385-1 details the requirements of SOP preparation and dissemination. The Safety and Chemical Operations Branch reviews each SOP, and a Job Hazard Analysis is conducted and filed with the Safety and Chemical Operations Branch. USAMRICD Memorandum Number 385-1 mandates the format and content of each SOP. All SOPs must be reviewed and signed by the employee conducting that specific operation or procedure. SOPs must be posted at the work site. SOPs must receive an annual review after which the contents must be reviewed again and signed by employees.

All work at USAMRICD must be conducted according to approved research protocols. The rigorous process of approving an experimental protocol involves numerous steps including the approval of the USAMRICD Commander. The policies, responsibilities, and procedures for preparation of research protocols is detailed in USAMRICD Memorandum Number 70-9 (Research, Development and Acquisition Research Protocols). Experimental protocols must be examined for compliance with safety regulations, chemical needs, waste disposal methods, animal use, radioactive materials rules, hazardous waste minimization guidelines, regulations for the storage and disposal of hazardous materials and wastes, and the adequacy and appropriateness of the SOPs in use. This process provides a thorough examination of the requirements of experiments as well as an opportunity to examine the potential impacts of the operations on safety, waste stream management, and occupational health.

Guidelines for general laboratory safety are detailed in Chapter 5, Memorandum Number 385-1. Included are specifications for the use and maintenance of laboratory safety equipment and engineering controls (laboratory ventilation systems, biological cabinets, gloveboxes). Physical safety requirements such as protective clothing and engineering control specifications are detailed in Chapter 4 and Chapter 5, USAMRICD Memorandum Number 385-1. Each operational SOP states requirements for the safety equipment (e.g., antidote, fire extinguisher, masks) which must be present or in use during the performance of specific laboratory activities. Items such as eyewash stations and emergency showers must be located in all areas where hazardous chemicals are found. Safety showers must be inspected semi-annually by APGSA,, and laboratory workers must inspect eyewash stations on a monthly basis. All safety equipment must be tagged to indicate its inspection status.

The DA has a Safety and Occupational Health Program designed to promote health and reduce the risk of injury and illness related to job performance (AR 385--10).- The USAMRICD program employs preventive measures for the military and civilian personnel who work with or who have the potential for exposure to toxic materials, carcinogens, infectious materials, or other work conditions which may be hazardous. The program also must assure that individuals meet the required physical standards prior to commencing wore Each worker must receive a thorough safety orientation and must be issued appropriate safety equipment (USAMRICD Memorandum Number 385-1). Additional information regarding the medical monitoring of personnel is located in Section 2.10.1.

For information regarding safety procedures specific to the use of CSM,, biological toxins radioactive materials, and toxic gases see Section 2.4.

2.4 Use of Hazardous Materials

2.4.1 CSM

The USAMRICD uses small quantities of CSM in support of its mission to research and develop medical defenses to chemical warfare agents and medical treatment for chemical casualties. CSM is defined as "all lethal and incapacitating chemical agents and their related weapon systems that are either adopted or being considered for military use" and which are the subject of AR 50-6 (Chemical Surety). USAMRICD Memorandum Number 385-1 defines chemical agents as "chemical substances intended for use in military operations to kill, seriously injure, or incapacitate man through its chemical properties". AR 50-6 regulates all operations involving chemical agents. Mixtures of such compounds containing chemical agents at concentrations greater than or equal to two milligrams per milliliter are considered CSM and are covered by AR 50-6.

The CSM currently in use at USAMRICD are GA (Tabun), GB (Sarin), GD (Soman), GF, VX, H (Mustard), HD (Distilled Mustard), and L (Lewisite) (Valdivia, 1992a). CSM is categorized according to its action. Blister agents (also known as vesicants) affect skin, eyes, and respiratory tissues. The vesicants in use at USAMRICD are H and HD (mustard agents). These easily absorbed agents are capable of causing severe blistering as well as tissue destruction to exposed tissues. Nerve agents cause the disruption of the nerve impulses in the body which may result in severe impairment of breathing, vision, and muscles. Nerve agents in use at USAMRICD are GA, GB, GD, GF, and VX.

USAMRICD is categorized as a Vb facility according to AR 50-6. Category V includes CSM used for authorized research, development, test, and evaluation (RDT&E) projects, specific surveillance programs, intelligence evaluations, or scheduled training programs. Category Vb involves quantities greater that one milliliter but less than or equal to one liter of neat chemical agent. Neat chemical agent is undiluted (full-strength) as synthesized by the manufacturer. The entire facility (USAMRICD) currently has less than 150 milliliters (approximately five fluid ounces) of CSM on the premises (Casole, 1991). Solutions of chemical agent which have been reduced in strength by dilution and which may be handled as other hazardous substances are considered Exempt Chemical Surety Materiel (XCSM) (AR 50-6).

Laboratory work involving CSM must comply with USAMRICD SOP Number 87335-RS-GP (General Provisions for CSM) and SOPs which have been prepared for specific protocols. A permitting system defines areas in which CSM, XCSM, or biological toxins may be used or stored and provides information for materiel tracking. Room permits, approved by the USAMRICD Commander, allow XCSM or biological toxin experimentation to proceed within specified laboratories. CSM permits can only be issued for the chemical restricted section (BB Area) of Building E3081 which meets the physical security requirements of AR 190-59.

Work with CSM must be conducted during normal duty hours to assure that all necessary safety and medical support is available. Procedures which must be followed in the event of chemical surety work during non-duty hours are located in USAMRICD Memorandum Number 385-1. Employees engaged in work with chemical agents must obtain a "Certificate of Employee Training in the Use of Exempt Chemical Surety Materiel (XCSM)/Chemical Surety Materiel (CSM)" prior to clearance for work with chemical agents. The procedures for monitoring the engineering control systems involved in CSM work are detailed in paragraph E4 of USAMRICD SOP Number 87-335-RS-GP (USAMRICD Memorandum Number 385-1).

A hazard analysis to determine safety precautions, personnel protection, engineering features, and procedures to prevent exposure must be performed for each hazardous operation at USAMRICD, including those involving CSM. Specialized SOPs which include safety, personnel clothing and equipment, and spill clean-up procedures must be developed for each hazardous operation. A copy of the SOP must be kept by the Principal Investigator (PI) for each protocol.

CSM is received from the USACBDA Chemical Transfer Facility located at the Edgewood Area of APG and transferred by the U.S. Army Technical Escort Unit (USATEU). The materiel which is being transferred must be kept in tertiary containment The authorized custodian must sign transfer documents and, along with his or her "buddy", must be dressed in the required protective clothing, have a readily accessible protective mask, and must be wearing the appropriate safety gloves. The materiel must be brought directly to Room BB 277 and placed inside the hood. Explicit directions for unpacking the shipping container, preparing the CSM for storage, securing and accessing the agent within the storage hood, removing CSM from within the engineering controls of the hood, transporting CSM within the chemical limited area, unpacking the CSM from its primary container, preparing aliquots (portions) of dilute CSM into XCSM, the repackaging of CSM, the issue of CSM, and the repackaging of CSM for distribution on post are described in USAMRICD SOP Number 87-335-VA-10 (Storage, Receipt, and Issue of Chemical Surety Materiel (CSM) and Aliquoting XCSM from Dilute CSM). USAMRICD SOP Number 87 335-VA-11 (Dilution and/or Transfer of Liquid Chemical Surety Materiel) describes the procedure for preparing dilutions of CSM.

In accordance with its Support Agreement, USACBDA monitors operations involving chemical agents. This activity involves monitoring the first five days of new agent operations, the quarterly monitoring of continuing agent operations, and the monitoring of CSM storage, clothing requirements, and the handling and disposal of contaminated wastes. USACBDA also monitors chemical fume hoods, removed hood exhaust filters, and other related equipment. Monitoring data obtained from these procedures must be compiled into the USACBDA Monitoring Data Base in accordance with OSHA requirements. Results of monitoring must be reported in writing to the USAMRICD Safety Office. Immediate verbal reports must be given if results are at or above action levels. In ten years of USACBDA monitoring, there have been no indications of contamination (Valdivia, 1992b).

USACBDA also provides laundry services for washable wearing apparel which has been used in an agent environment. A certificate (SMCCR Form 1093 or SMCCR Form 102) indicating that the garment has been appropriately decontaminated to the 3X level must accompany the garments. For a description of contamination levels see Section 25.2.

2.4.2 Other Hazardous Chemicals

The USAMRICD must comply with all aspects of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard which mandates access to information and training regarding the handling, use, and storage of hazardous chemicals (Title 29 Code of Federal Regulation (CFR) 1910.1200). The criteria for the designation of a chemical as hazardous are described in 29 CFR 1910.1200. In compliance with the Hazard Communication Standard, the Logistics Branch, USAMRICD, must maintain a listing of all hazardous chemicals. Each individual laboratory must maintain a list of the chemicals used within the laboratory, and persons in the laboratory are responsible for being informed about the hazards associated with exposure to and use of the chemicals with which they work. In compliance with the Hazard Communication Standard, Material Safety Data Sheets (MSDS) must be available for all chemicals on the inventory list. With the exception of chemicals under development in research laboratories, an MSDS is available in each laboratory area for each hazardous chemical present. The standard also requires that warning labels be present on all containers which contain hazardous chemicals and that all employees receive training regarding the safe handling, use, and storage of hazardous chemicals. Employees of USAMRICD are knowledgeable about laboratory hazard information. Supervisors are responsible for ensuring the safe operations of the laboratory and enforcing safety practices of employees. Information regarding the disposal of hazardous chemicals is located in Section 253.

Toxic gases in use at USAMRICD include perfluoroisobutylene (PFIB), phosgene (CG), and bis(trifluoromethyl)disulfide (TFD) (Valdivia, 1992a). Exposure of experimental animals to the toxic gases PFIB, phosgene, and TFD is detailed in SOP Number 91-203-YY-06 (Standing Operating Procedures for Exposures to Pulmonary Toxicants). All such work must be conducted in the presence of at least two people. Determination of the gas to be used and its exposure concentration is the responsibility of the laboratory supervisor. All exposure of animals to toxicant must be conducted under a laboratory fume hood which is certified for this use in accordance with USAMRICD Memorandum Number 385-1. The exposure of animals must be through the nose-and-mouth-only route of administration as appropriate for the experimental animal species and in accordance with SOP Number 91203-YY-06. Use of phosgene, PFIB, and TED with cells in attached or suspension cultures must be carefully controlled and monitored within USAMRICD as detailed in USAMRICD SOP Number 91-317-YY-08 (SOP for Exposure of Cell Cultures to Edemagenic Gases) and USAMRICD SOP Number 90-033-YY-01 (SOP for Phosgene Exposure of Cell Culture).

All work with toxic gases at USAMRICD must be conducted in approved fume hoods and in accordance with referenced SOPs. When toxic gases are in use, a sign must be posted on all doors to the laboratory clearly indicating that toxic gases are in use and prohibiting the entry of unauthorized personnel. Emergency evacuation of the laboratory is required should the contents of the gas cylinder be released into the room. If the hood ceases to function then the operator would first turn off the gas cylinder or the syringe pump (depending on the route of gas administration) prior to evacuation of the room. All compressed gas cylinders containing toxic gas must be kept secured as indicated in SOP Number 91-203-YY-06.

The instruments through which toxic gases are administered and monitored must be kept inside of a fume hood during experimentation. Before they are vented to the fume hood ventilation system and its associated filters, toxic gases must be vented through an M18 filter. This filter can handle a flow rate of 283 liters of gas per minute. It contains 850 milliliters of activated charcoal. The adsorption capacity of the M18 filter depends on the type of material which passes through it as well as other physical factors such as the relative humidity of the air it receives. After passing through these filters, the waste toxic gas is exhausted through a Chemical, Biological, and Radiation (CBR) filter Two different types of CBR filtration systems are available at USAMRICD. The filters located in E3244 and E3100 are composed of a pre-filter, a high efficiency particulate air (HEPA) filter, and a high-efficiency gas absorbing (HEGA) filter in tandem. The CBR filter located in E3081 contains a pre-filter, followed by HEPA, HEGA, HEGA and HEPA filters. The HEPA filters remove 99.97 per cent of particulate matter which is greater than or equal to 03 micrometers. Organic vapors are reduced 99.99 per cent by passage through a HEGA filter. The APGSA replaces CBR filters. Waste M18 filters are double-bagged and disposed of as hazardous waste as detailed in AR 200-1.

Details regarding the appropriate personnel protective equipment, use of monitoring equipment, first aid, fire fighting equipment, and emergency procedures are located in the USAMRICD SOP Numbers 91-203-YY-06, 91-317-YY-08, and 90-033-YY-01. Supervisors are responsible for assuring that all laboratory workers read and understand the relevant SOPs and have a thorough knowledge of the hazards and requirements of working with tome gases. This responsibility includes verifying that the workers understand the appropriate steps to take in the event of an emergency. All staff working with toxic gases must wear the required protective clothing (gas masks are readily accessible to the worker at all times). Workers are also required to assure the security and containment of the toxic materials at all times.

Gas cylinders contain a maximum of 100 grams of PFIB or TFD. Phosgene cylinders contain 454 grams. When not in use, these cylinders must be locked in an approved laboratory fume hood. TFD is a liquid at room temperature and must be stored within an approved fume hood in a sealed container. Contents of these cylinders must be monitored monthly by weighing (in the case of gases) and by volumetric determination in the case of TFD. In addition, gas consumption must be carefully followed through the use of written logs. Empty cylinders must be returned to the Logistics Branch (SOP Number 91-203-YY-06). Sodium hydroxide must be stored in the immediate vicinity for use as a decontaminant in the event of a spill. Whenever such containers are transported, they must be placed inside additional containers so that, in the event of a spill, the spill will be contained (SOP Number 91-203-YY-06).

Work with cyanide takes place in E3081 and E3100. All individuals working with cyanide must be fully knowledgeable in its use, its chemical and physical properties, the hazards associated with its use, and all relevant safety procedures. Ventilation requirements, personal protective equipment, tools and equipment, monitoring apparatus, and information regarding first aid, emergency treatment, and the toxic effects of cyanide are detailed in USAMRICD SOP Number 91-344-YY-10 (Cyanide Inhalation Safety SOP) and SOP Number 91-275-PB-07 (Cyanide Safety SOP).

Containers of cyanide must be clearly labeled with the hazards of cyanide exposure. All work with cyanide must be conducted with at least two people present in the laboratory. A "Toxic Gas In Use" sign must be posted on all of the doors to the laboratory. Cyanide must be stored in cylinders which are locked inside an approved laboratory hood. Once empty, cylinders are to be returned to Logistics for return to the manufacturer (USAMRICD SOP Number 91-344-YY-10). Additional information regarding the disposal of waste toxic gas is located in Section 253.

The use of known or possible carcinogens in the laboratories of USAMRICD must be carefully controlled and monitored. Known or suspected chemical carcinogens are those **which** have been identified by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), the American Conference of Governmental Industrial Hygienists (ACGIH), and OSHA. The safe use of these chemicals and requirements of those employees who work with such chemicals is detailed in USAMRICD Memorandum Number 385-1.

When work is performed using known or suspected carcinogens, numerous safety precautions, including the use of fume hoods, must be used. In addition, all containers which hold known or suspected chemical carcinogens must be labeled with the full chemical name of the compound, the Chemical Abstract Service (CAS) number, whether the chemical is a known or suspected carcinogen, potential health hazards, and the areas of the body which are sensitive to the actions of the chemical. Vacuum systems used with chemical carcinogens must be equipped with HEPA filtration and a liquid map Volatile carcinogens must not be used with the vacuum system but with a separate vacuum pump inside of a laboratory fume hood (USAMRICD Memorandum Number 385-1). The medical monitoring of personnel who work with chemical carcinogens is discussed in Section 2.10.1.

2.4.3 Biological Toxins

The toxins periodically in use at USAMRICD are botulinum, palytoxin, ricin, saxitoxin, staphylococcal enterotoxin B, and tetrodotoxin (Valdivia, 1992a; Foster, 1992). Only operations necessitating the use of Biosafety Level (BSL) BSL-1 or BSL-2 are permitted at USAMRICD. Agents requiring the use of BSL-1 are those having no known or minimal potential hazard to either laboratory personnel or to the environment (CDC/NIH, 1988). Agents requiring the use of BSL-2 are those having moderate potential hazard to laboratory personnel or to the environment (CDC/NIH, 1988). Once isolated from their biological source, toxins are considered noninfectious biological hazards. Laboratories handling tomes must have the same engineering safety controls and follow the same safety procedures as a BSL-2 laboratory except that an autoclave is not necessary if other appropriate decontamination measures are available (DA Pamphlet 385-69). A toxin which has a Minimum Lethal Dose greater than 150 micrograms/kilogram may be handled in a BSL-1 facility (SOP Number 91-077-RS-02, General Provisions for Biosafety Operations, 1991). No work requiring BSL-3 or BSL-4 procedures and controls is performed at USAMRICD (SOP Number 91-077-RS-02).

Biological toxin operations at USAMRICD utilize the controls similar to those outlined for BSL-1 and BSL-2 (CDC/NIH, 1988) but must also adhere to the requirements of DA Pamphlet 385-69). SOPs for the use of biological toxins are located in SOP Number 91-077-RS-02. All personnel working with toxins must be totally familiar with the contents of the SOP governing their use and must attest to their knowledge in a signed statement. Individuals performing tasks under this SOP must review it every 12 months and verify this review in writing (SOP Number 91-077-RS-02).

The USAMRICD currently uses botulinum toxin, palytoxin, staphylococcal enterotoxin B, ricin, saxitoxin, and tetrodotoxin in research activities (Foster, 1992; Valdivia, 1992a). Safety requirements for work with these biological toxins are found in AR 385-69 (Biological Defense Safety Program, 32 CFR 626), DA Pamphlet 385-69 (Biological Defense Safety Program - Technical Safety Requirements, 32 CFR 627), and USAMRICD Memorandum Number 385-1. All work with toxins requires an approved SOP (see Section 2.3) which must be available at the work site. USAMRICD Memorandum Number 385-1 requires a minimum of two people present and within audible range of each other while operations are in progress. No unnecessary or unauthorized individuals are permitted to enter the work area during operations. All individuals working with tones must be trained in the applicable laboratory protocol, the use of protective clothing and equipment, procedures for decontamination, and emergency measures. Those working with toxins must be knowledgeable in first aid and self aid for toxins in use and must be informed about the signs and symptoms which might be present in an individual exposed to toxin (USAMRICD Memorandum Number 385-1). USAMRICD performs no work requiring greater containment practices than the equivalent of BSL-2.

Any laboratory within the USAMRICD which utilizes a biological toxin must post a "Caution, Toxic Agent" sign on all entrances. This sign (which must be kept current and accurate) identifies the type of toxin present in the laboratory and details any special requirements or precautions to be followed prior to entry. The handling of crystalline toxin (not in solution) must be within a hood. Information regarding training required of individuals working with tomes is located in Section 2.8.

Animals which have been treated with toxin and the wastes which they generate are considered hazardous for a period of seven days. In accordance with USAMRICD Memorandum Number 385-1, the concentration of toxin in urine must be monitored during this period. A concentration of less than 10 nanograms of toxin per milliliter of urine is considered non-toxic. The seven-day period must be maintained even if this concentration is reached prior to the seventh day. Information regarding the disposal of waste biological toxin is located in Section 25.4.

2.4.4 Radioactive Substances

Certain USAMRICD operations, such as labeling organic compounds, measuring enzyme activity, measuring the rate at which a compound moves through tissues (skin, membranes), and measuring blood flow rates or volumes, require the use of radioactive materials. USAMRICD is authorized by the U.S. Nuclear Regulatory Commission (NRC) to use radioactive materials in its research activities and for the calibration of instruments. USAMRICD has a limited broad-scope NRC license which expires on February 28, 1996 (see Appendix D). Prior to issuance of this license, USAMRICD operated under the NRC license of USACBDA. The USAMRICD is authorized to use the following radioactive materials: hydrogen-3, carbon-14, phosphorus-32, sulfur-35, calcium-45, iodine-125, nickel-63 (plated foils), and cesium-137 (sealed sources). Under the provisions of the license, USAMRICD cannot use radioactive materials in applications which may result in the release of radioactivity exceeding the standards set in 10 CFR Part 20 into the environment or on humans. The NRC license also requires that USAMRICD have a health physicist Radiation Protection Officer (RPO) who assumes the responsibility for providing radiologic surveys and ensures compliance with NRC and DA regulations relating to the use of radioisotopes. USAMRICD also has a Radiation Protection Committee (RPC) which, along with the RPO, must approve the operations and work areas in which radioactive materials are used.

All operations requiring the use of radioactive isotopes must be conducted according to SOPs which meet or exceed NRC standards. Safety requirements for working with radioactive materials are described in SOP Number 90-282-RS-04 (Radioactive Materials Safety SOP) and USAMRICD Memorandum Number 385-2 (Safety-Radiation Protection). These safety requirements encompass the use, storage, inventory, and receipt of radioactive materials and the personnel protective clothing required when working with radioactive materials.

SOP Number 90-282-RS 04 and USAMRICD Memorandum Number 385-2 specify that any laboratory operation involving the use of radioactive material can occur only in designated areas approved by the Radiation Protection Committee and the Radiation Protection Officer. The use or storage of food, drinks, cosmetics, or tobacco is not permitted in any laboratory or any area or room where radioactive materials are present. All laboratory operations involving radioactive materials must be conducted in HEPA filtered and charcoal-filtered fume hoods. Verification of the proper operation of these fume hoods must be made twice yearly by the Industrial Hygiene Section of the Kirk U.S. Army Health Clinic. Fixed-sources such as gas chromatographs generating volatile products must be vented to hoods. Wipe tests on these sources must be conducted twice yearly. USAMRICD must use and handle radioactive materials in accordance with all relevant protocols and securely store radioactive materials to prevent exposure to unauthorized individuals who would otherwise not be occupationally exposed.

For a description of the medical monitoring of personnel who work with radioactive materials see Section 2.10.1. For a description of the procedures used for disposal of radioactive wastes see Section 255.

2.4.5 Engineering Controls

Work with hazardous chemicals must be conducted inside specially designed fume hoods which vent and filter any fumes released during an experiment. The use of these systems prevents the release of vapors into the laboratory. To ensure that any resultant emissions from the stacks meet current air pollution standards, the filter systems are designed to trap both particulate matter and organic vapors. Injections to animals which are too big to put inside of the hood may take place using XCSM only. In such protocols, work with the XCSM itself (including the loading of the agent into a syringe) must be done under the hood (Casole, 1991)

All USAMRICD laboratories with permits to use CSM must have redundant filter systems. Work involving CSM must be conducted within fume hoods equipped with filter systems. These five-stage filter systems include a pre-filter, a HEPA filter, two HEGA filters in tandem, and a redundant HEPA filter (Casole, 1991; Valdivia, 1992c). Two fan lines are present so that, if one fails, the other can take over, and air will continue to flow through the filters (Casole, 1991). Hoods in the BB Area of Building E3081 have emergency power systems. Three-stage filter systems are used in the fume hoods present in all other laboratories, including those using XCSM. Three-stage filters consist of a prefilter, carbon absorber, and a HEPA filter in sequence (Casole, 1991; Valdivia, 1992c). All hoods in use at USAMRICD are filtered.

Ventilation systems used with toxic material (carcinogens, pathogens, mutagens, perchloric acid, fetotoxins, or teratogens) must have alarms (audible and visual) to signal power failure, mechanical disturbances, or inadequate movement of air. The Logistics Branch is responsible for assuring that the ventilation systems used for biological control are tested semi-annually and that they continue to meet manufacturers specifications (USAMRICD Memorandum Number 385-1).

The Kirk Army Health Clinic, Industrial Hygiene Section, certifies fume hoods using air flow and smoke capture testing. The smoke capture test assesses the movement and/or the leakage of air from a hood. Hoods which have passed these tests are certified. Hoods which are not certified may not be used. A sticker listing the date on which certification expires and the type of work authorized within the hood identifies a certified hood (USAMRICD Memorandum Number 385-1) (see Appendix C).

2.4.6 Security

The Edgewood Area of APG is an open post. The laboratory activities of USAMRICD take place in three buildings (E3081, E3100, and E3244) within the Edgewood Area of APG. Although access to the post is not restricted, access to buildings is limited by the security systems described below.

Admittance to USAMRICD buildings requires a computer coded access badge which is also necessary for access into the internal corridors of the building. In order to obtain an access badge, visitors must relinquish their drivers licenses or other forms of photo- and place their names in a visitor register (Casole, 1991).

Areas which surround receptacles containing greater than one milliliter of chemical surety materiel are designated as exclusion areas in accordance with AR 50-6 (Chemical Surety). According to AR 50-6, in the absence of any positive protective measures, access to these areas constitutes access to the agent itself. Therefore, in compliance with AR 50-6, admittance to the BB Area (Chemical Restricted Area) within Building E3081 is severely restricted. Armed DoD police control and monitor access to this area Only those USAMRICD employees with a demonstrated need to work within this area may be allowed access. All visitors must be escorted. Access to the BB area involves the exchange of a general access badge for a BB-specific area badge. This badge must be displayed visibly at all times. When not occupied, this area is protected by an intrusion detection system capable of detecting unauthorized attempts to enter or exit the area. Patrols monitor the building externally at random times throughout the 24-hour day. Violation of these security systems or the internal activation of strategically located panic buttons brings an armed response.

Within the BB Area, chemical surety materiel must be locked within the earthquake-, hurricane-, and nuclear-proof vault which is inside the bottom of a fume hood incorporating full containment-engineering controls in a double-locked room. Access to the fume hoods and storage vaults requires the presence of two individuals and two sets of keys (Casole, 1991).

Those allowed access to chemical surety materiel in the BB exclusion and/or limited areas must be authorized individuals approved in the CPRP (AR 50-6, Department of Defense Directive [DoDD] 5210.65). CPRP, as described in Chapter 3, AR 50-6, provides a way of assessing the reliability and acceptability of persons for working in chemical duty positions. The provisions of AR 50-6 apply to military, civilian, and contractor personnel. Persons cannot perform chemical surety dudes until they have been screened and certified for CPRP by the certifying official and have also been certified in the specific chemical duties which they will perform. Currently, 11 people are in the CPRP at USAMRICD (Valdivia, 1992a). Other details about the certification of personnel for the CPRP are located in AR 50-6.

Certain USAMRICD SOPs require that two authorized individuals must be present during any operation involving CSM. This "two-man concept" involves an ongoing program of observation and evaluation which requires that each of these individuals be familiar with the experimental protocol and all associated security and safety measures which must be followed in its execution. The individuals must be able to see and hear each other at all times both as a safety and security precaution. Individuals who are in the CPRP must be continually observed by their fellow workers as well as by their supervisors. This evaluation is intended to assure that any change in the attitude, behavior, or health (observed on-duty or off-duty) which may necessitate the worker's removal from this type of daily work is brought to the attention of the certifying official for appropriate action.

In accordance with the Support Agreement (Support Agreement Number W52H09-), USACBDA is responsible for making certain that USAMRICD's work with CSM is considered m the preparation of the physical security plan, tactical defense plan, and the site vulnerability assessment. USACBDA also provides security guard support including static manned posts, patrol checks of surety area, response force deployment, and control and maintenance of guard force procedures and training.

2.5 Waste Stream Management

2.5.1 Solid Waste

The amount of solid waste generated by USAMRICD in 1991 was estimated at about 50,000 pounds. This waste included 36,000 pounds of assorted paper, 6,600 pounds of plastic, 2,500 pounds of glass, 2,500 pounds of ash (three 30-gallon drums of dry ash per week from the medical waste incinerator) and 2,400 pounds of wood (U.S. Army Medical Research Institute of Chemical Defense, 1990; Valdivia, 1991). Solid waste is ultimately either incinerated in the Harford Waste-to-Energy Plant, recycled through the APG Recycling Program, or disposed of in a sanitary landfill (Valdivia, 1991). Only nonhazardous solid waste is disposed of at the Harford County Waste-to-Energy Plant.

For information regarding animal and medical waste see Section 25.6. For information regarding solid waste containing CSM see Section 2.5.2.

2.5 CSM Waste

USAMRICD guidance for the safe disposal of wastes contaminated with CSM is found in SOP Number 87-355-VA-12 (Disposal of decontaminated/detoxified Chemical Agent Waste) and SOP Number 89-202-VA-05 (Neutralization of Alkaline decontaminated/detoxified Chemical Waste Solution). All material which is contaminated or potentially contaminated with CSM is considered toxic. Materials contaminated with an unknown concentration of CSM are designated 1X (X) (AR 50-6). A 1X classification indicates that the precise level of contamination is unknown.

The 3X (XXX) level of decontamination indicates that the surface of the material has been decontaminated. 3X material must be placed in appropriate containment and monitored to verify that agent vapor concentrations surrounding the item are at or below the standards stated in DoD 6055.9-STD (Ammunition and Explosive Safety Standards). Material having a 3X designation must be maintained under control of the federal government.

A 5X (XXXXX) level of decontamination indicates that the material is completely free of any chemical agent. Verification of this level of decontamination is required prior to the unrestricted release of any waste from government control (AR 50-6). This level of decontamination is achieved by heating at 1,000 degrees Fahrenheit for 15 minutes (times may vary depending upon the characteristics of the item or items to be decontaminated). A discussion of the most accurate way of determining and expressing "zero" contamination is currently underway within the Army.

It is the responsibility of the chemical agent user to assure that waste is decontaminated to 3X separated by chemical agent category (SOP Number 87-335-VA-12, Disposal of Decontaminated/Detoxified Chemical Agent Waste) and state (liquid or solid), and accompanied by the proper documentation (see Appendix C) (SMCCR 1008, Toxic Container Label and Liquid Waste Turn-in Certification Sheet Hazardous Constituents) prior to disposal. Liquid chemical agent waste is effectively neutralized by treatment with sodium hypochlorite (bleach) or sodium hydroxide which irreversibly destroys the chemical structure of the agent. Decontamination procedures specific to agent category are detailed in SOP Number 87-335-VA-12, Annex H. Solid chemical agent waste is treated to the 5X level by the disposal process of the USACBDA incinerator.

Supervisors and Branch Chiefs are responsible for documenting adherence to these waste preparation procedures (DA Form 3161). This form certifies that the waste has been properly decontaminated according to all applicable regulations, that no sealed containers are present, and that SMCCR Form 1008 and Certificate of Hazardous Constituents forms have been completed. The Logistics Branch provides packaging material necessary for disposal of the decontaminated chemical waste (carboys, drums, pallets, etc.).

Solid waste which has the potential for being contaminated with CSM must be decontaminated according to the procedures detailed in SOP Number 87-335-VA-12, Annex H. Once decontaminated, solid wastes must be placed within double plastic bags. Solid, double-bagged waste must be packaged into fiberboard drums filled with absorbent material such as vermiculite. Sharps (e.g., needles and syringes) must be kept separate from other solid waste and must be packaged in double plastic bags in metal cans with taped lids. Removal, decontamination, monitoring, and disposal protocols for items such as fume hoods, ventilation ducts, stacks, and filters are detailed in USACBDA Regulation 385-1 (Chapter 7; Preparation, Decontamination, Storage and Disposal of Chemical Agent/contaminated Waste Material).

All toxic and potentially toxic solid waste materials, such as filters, must be double wrapped in heavy plastic, secured on pallets, and placed in an outdoor, fenced storage site outside of E3100. This storage lot is inventoried and monitored by the Logistics Branch. USACBDA quantifies the level of contamination of this material by the analysis of air samples (bubble monitoring) taken from within the wrapped materials. The bubble monitoring of this waste material is done in the storage lot by USACBDA personnel when ambient temperature is appropriate (70 degrees Fahrenheit) in accordance with an interservice agreement (see Section 2.1). The sealed plastic wrappings provide a head-space internally from which the sample used for determining decontamination status can be drawn. Once the materials are certified as 3X the Logistics Branch arranges for their transfer to USACBDA for incineration. There are no recorded incidents of wastes failing to be certified as 3X (Schafer, 1992).

The USACBDA incinerator is inspected and permitted by the State of Maryland for the decontamination and destruction of toxic materials. The USACBDA incinerator burned 44,300 pounds of waste in 1990 and 52,449 pounds of waste in 1991 (Casole,, 1992d). All surface decontaminated (3X) CSM waste generated at USAMRICD must be incinerated in the USACBDA incinerator. On a yearly basis, USAMRICD contributes 275 gallons of liquid CSM waste (five 55-gallon containers) and 1,176 gallons (49 24-gallon containers) of solid CSM waste yearly to the USACBDA incinerator (see Table 2-2) (Casole,, 1992d).). The USACBDA incinerator operates under a RCRA permit issued in 1985 which is currently under review for renewal by the MDE. USAMRICD provides only 3X (surface decontaminated) waste for burning in the USACBDA incinerator; the burning process reduces this waste to 5X status (completely free of any chemical agent). This ash is then tested by USACBDA for the presence of any additional hazardous constituents. Hazardous ash is disposed of through the Hazardous Waste Tracking System. Nonhazardous ash is disposed of through a solid waste contractor. Ash from this incinerator is distinct from the ash referenced in Section 25.1 and is not disposed of at the Harford County Waste-to-Energy Plant nor the Harford County Sanitary Landfill.

Decontaminated liquid wastes must be collected at the site of usage in five-gallon containers which are then brought to the chemical agent decontaminated waste room at designated weekly collection intervals (Room 160, Building E3081). All containers must have a "Liquid Waste Turn-In Certification Sheet". Decontaminated waste solution must be put into drums and must be incinerated by USACBDA. Disposal must be according to USACBDA regulation 385-1 (Chapter 7; Preparation, Decontamination, Storage and Disposal of Chemical Agent/Contaminated Waste Material). Five-gallon carboys are emptied into 55-gallon polyethylene-lined metal drums. Both the solid and liquid waste containers must then be stenciled to indicate the following information: the level of decontamination (3X), USAMRICD Building E3081,, the name and telephone number of the Exclusion Area custodian, the name of the chemical agent, and the name of the decontamination solution. Each fiberboard or metal drum must be labeled with a completed SMCCR Form 1008. The Exclusion Area custodian also must complete a DD Form 1911 which contains a listing of the pallet, container or item number, and a description of the level of decontamination (X 3X or 5X determination). Decontaminated CSM waste containing flammable solvents must also be collected separately. Waste containing flammable material must be stenciled with "flammable" and this condition is noted on Form 1911. The Exclusion Area custodian must sign the certificate to verify the accuracy of the level of decontamination. The individual from USATEU who picks up the waste must also sign DD Form 1911 (SOP Number 87-335-VA-12). Requests made to USATEU for the movement of waste must be made at least five days prior to the desired date of transport

Table 2-2 Operational Characteristics of the USACBDA Decon/Detox Incinerator Data (Data taken from Roth, 1990; Casole, 1992d)

Characteristic	1988	1989	1990	1991
Operation Time (days)	114 days	173 days	NA[a]	NA
Fuel Usage (gallons)	53,010 gallons	80,445 gallons	NA	NA
Waste Incinerated per year (pounds)	218,707 pounds	435,958 pounds	44,300 pounds	52,449 pounds

[a]NA = Not Available

and must include the names, phone numbers, and locations of both shipper and receiver and a complete description of all of the items which are to be moved (quantity, weight per unit, chemical name, agent category name). Only certified personnel may transport waste. These individuals must be knowledgeable about working with chemical agents, the symptoms associated with exposure, and appropriate treatments for accidental exposures (USACBDA Regulation 385-1, Chapter 7).

Guidance for management and disposal of wastewater originating from sources within Building E3081 (laboratory animal and chemical surety facility) is found in SOP Number 87(Laboratory Waste Water Management and Procedures for the BB Area) as well as SOP Number 87-335-RS-GP (General Provisions for CSM,, Building E3081 BB Area), USAMRICD SOP Number 87-335-RS 02 (Hazardous Laboratory Waste Water Disposal Methods for Building E3081,, BB Area) and USAMRICD SOP Number 87-33-VA-07 (Extraction and Analysis for CSM in Waste Water from Holding Tanks).

All wastewater from the BB Area must be collected and held in one of two 10,000 gallon fiberglass wastewater holding tanks located in Building E3081 (room BB 184). These tanks serve as part of a series of redundant features which prevent the release of wastewater potentially containing traces of CSM into the sanitary sewer system. Wastewater entering these tanks originates from floor drains (Rooms BB 277, 281, 285-292 and BB Area main corridor), laboratory sink drains (Rooms BB 277, 281 and 285-292), safety shower facility drains (Rooms BB 282, 284 and 182), and the sump drain in the wastewater holding tank facility (Room BB 184). Although not routinely used, the cage washers and sinks in the BB Area cage wash facility (Rooms 275 and 276) are also sources of wastewater destined for these tanks.

A fluid level indicator gauge located on the outside of the tank must be monitored for the volume of wastewater accumulated in the tank. Wastewater is collected in Tank Number One for a period of two weeks or until the automatic indicators on the tank indicate that it is three-fourths full. Employees from Veterinary Medicine at that time must divert the flow of water from Tank Number One to Tank Number Two. All accumulated materials in these tanks must be tested for the presence of CSM when there is reason to suspect that there may be contamination. A sampling port located on the tank facilitates testing This sampling port is part of a sophisticated system which allows for sampling, introduction of decontaminants, and agitation of the tank contents. Historically, no contaminant has ever been detected in these tanks (Valdivia, 1991). Following its containment and analysis, accumulated wastewater which has tested negative for the presence of CSM is released into the sanitary sewer. The maximum rate of wastewater release is limited by the drain and piping capacity which, in accordance with requirements for hook-up to the water treatment plant, are designed to ensure that the plant's capacity is not exceeded.

Special procedures would be instituted according to SOP Number 87-335-RS-01 in the event of a chemical accident/incident during which CSM entered the wastewater system and the holding tanks. Clean-up procedures would be coordinated between the Safety and Chemical Operations Branch and the USATEU. Personnel from the Analytical Chemistry Branch would obtain and analyze samples (500-1000 milliliters) of the contents of the holding tank for the presence of CSM according to the method described in SOP Number 87-335-VA-07. In the event that CSM were detected, the contents of the holding tank would be decontaminated by the addition of sodium hydroxide, sodium hypochlorite, or another appropriate decontaminant in accordance with SOP Number 87-335-RS-GP. The decontaminant would be introduced into the holding tank (through the decontaminant port) and also through the drain which served as the port of entry of the contaminant into the system. Decontaminants are stored in Room BB 182.

The HEPA filters on all stacks are changed annually (Schafer, 1992). When the ventilation filters found in the BB Area (Building E3081) are serviced or replaced, workers must use a deluge shower located on the roof of Building E3081. The handling and management of the wastewater resulting from the use of this shower is in accordance with The Resource Conservation and Recovery Act of 1976 (RCRA,, 40 CFR,, Parts 261-270, as amended), COMAR 10.51.02, SOP Numbers 87-335-RS-01, 87-335-VA-07, and 87-335-VA. The drain of the deluge shower empties into a 500-gallon chemical storage tank located within a containment berm. The containment berm is designed to contain the volume of ten 55-gallon drums, the contents of the 500-gallon tank, plus a 10 percent margin of error. Accumulated wastewater in this tank must be analyzed for the presence of CSM by the Analytical Chemistry Branch no later than the first working day following its collection. Analysis must be in accordance with SOP Number 87-335-VA-07. Should detectable levels of contamination be measured, the contents of the tank must be decontaminated by the addition of an approved decontaminant (concentrated sodium hydroxide, sodium hypochlorite) with mechanical stirring for four hours. This procedure would be followed by repeat measurements for the presence of contaminant. Once testing indicates that the contents of this tank are no longer chemically contaminated, the wastewater may be transferred to 55-gallon drums using the hose and nozzle connected to the tank. Filled 55 must be labeled and transported by the USATEU to USACBDA for incineration.

2.5.3 Other Chemical Waste

The general policy of USAMRICD is to keep the quantity of chemicals stored in laboratories to the minimum amount required for ongoing projects (USAMRICD Memorandum Number 385-1). Chemical purchases must be made through the Logistics Branch. A computerized system helps assure that chemicals are purchased in quantities appropriate for the desired task and that non-approved materials are not ordered ("Casole,, 1991). Chemicals must be stored in compliance with the recommendations of the National Fire Protection Association (NF PA) Manual of Hazardous Chemical Reactions. These guidelines specify which chemicals pose a hazard if stored in the vicinity of one another. In addition, areas in which chemicals are stored must have a contents list, and each individual chemical container must be clearly labeled with the name of the chemical, any appropriate warnings, and the dates on which the chemical was received and opened (USAMRICD Memorandum Number 385-1).

Hazardous chemical wastes generated by USAMRICD include spent organic solvents, waste formaldehyde, solutions containing acetonitrile which are used in the preparation of tissues, and waste photographic fixative. Hazardous waste generators within USAMRICD must store hazardous wastes in an approved temporary storage site located outside of Building E3100. This storage facility is specially designed and permitted for the short term storage (less than 90 days) of hazardous waste. It contains safety features for the containment of spills and the proper storage of chemical wastes. Wastes may not be accepted without proper attached documentation and the approval of the Environmental Coordinator. Documentation which must accompany hazardous waste must be prepared prior to removal (by APGSA) of the waste to one of the installation-wide receiving points. APGSA assumes responsibility for picking up the waste from the temporary storage site and making arrangements with the contractor to remove the waste from the installation for disposal in accordance with RCRA (Beaulieu,, 1991; Schafer, 1991; Valdivia,, 1991). Currently, hazardous waste is transported by Chemical Waste Management, Inc. Wastes are taken to several permitted disposal sites (Valdivia,, 1992d).). USAMRICD generated 136 gallons of hazardous waste in 1990 and 156 gallons in 1991 ("Casole,, 1992e).). Detailed, installation-wide hazardous waste generation and disposal data for 1991 are currently being compiled (Sims, 1992).

An automated paper trail which allows cradle-to-grave tracking must be produced for all hazardous waste. This data base records the person disposing of the waste, chemical content of the waste, associated hazards, and volumes. The Environmental Management Division of APGSA maintains this information (Beaulieu,, 1991; Schafer, 1991; Valdivia,, 1991).

Hazardous chemicals such as volatile flammable liquids, mercury, grease, oil, or organic solvents cannot be poured into drains (USAMRICD Memorandum Number 385-1) Such chemicals and any other which is not suitable for discharge into drains must be placed into appropriate storage containers and collected in accordance with all hazardous waste regulations.

USAMRICD Memorandum Number 385-1 specifies that the materials used to construct chemical drains, traps, and fittings must be resistant to chemical degradation. Chemical drains are separate from sanitary or storm drains and lead to a holding tank Dedicated liquid waste and holding systems (such as for sinks, hoods and emergency showers) are required for any new construction or modifications to existing chemical drains. For information regarding the Edgewood Area Waste Water Treatment Plant see Section 4.1.4.

Waste toxic gases must not be vented to the atmosphere. Gases which remain unused may be neutralized or decontaminated as directed by the senior officer or supervisor

(USAMRICD SOP Number 91-317-YY-08). Charcoal (HEGA) filter units from the systems venting toxic gases must be double-bagged and disposed of as hazardous waste (USAMRICD) SOP Number 91-317-YY-08). Empty cylinders must be returned to the Logistics Branch for disposal as hazardous waste (SOP Number 91-203-YY-06). Empty cyanide cylinders must be returned to Logistics for return to the manufacturer (USAMRICD SOP Number 91-344-YY-10).

2.5.4 Biological Toxin Waste

Procedures for the disposal of solid waste contaminated or potentially contaminated with toxin are detailed in USAMRICD Memorandum Number 385-1. The user must treat the waste by soaking (4 to 16 hours) in a solution of 25 per cent sodium hypochlorite and 0.25 Normal sodium hydroxide or in commercial bleach. Following this decontamination procedure, the waste must be double-bagged in plastic, labeled ("Toxin Waste" and name of toxin), placed inside an additional labeled container, and released to be incinerated.

Solid combustible materials potentially contaminated with toxin must be immersed in liquid decontaminant by the waste generator and placed in plastic-lined paper bags. This material must then be sealed, labeled ("Toxin Waste" and name of toxin), and incinerated in the USAMRICD medical waste incinerator.

The bodies of animals used in toxin studies must be placed inside a fiber box which is then sealed and labeled ("Toxin Waste" and name of toxin). The box must then be placed in a labeled plastic lined paper bag and frozen prior to incineration. Cage racks must be decontaminated with a solution of sodium hypochlorite and sodium hydroxide prior to washing in the cage washer.

All liquid waste which is contaminated or potentially contaminated with toxin must be treated for 4 to 6 hours with a solution of 25 percent sodium hypochlorite and 0.25 Normal sodium hydroxide or commercial liquid bleach (one part liquid waste to one part of decontaminating solution) prior to discarding (USAMRICD Memorandum Number 385-1).

2.5.5 Radioactive Waste

In accordance with the Support Agreement (see Section 2.1), USACBDA (Hazardous Materials Section or contracted agency) collects, packages, and coordinates the disposal of USAMRICD's radioactive wastes. Users within USAMRICD are responsible for putting radioactive waste into the appropriate containers (liquids and solids separately) and for maintaining records of the waste materials they generate in accordance with USAMRICD Memorandum Number 385-2 (Safety-Radiation Protection). All waste containers must be identified as containing radioactive materials. Animal carcasses which are contaminated with radioisotopes must be sealed in plastic bags, labeled with a radioactive materials tag and an SMCCR Form 1069, and frozen pending pick-up in accordance with USAMRICD SOP Number 90-282-RS 04 (Radioactive Materials Safety SOP). Solid and dry wastes must be placed inside ridded metal cans lined with plastic bags. Scintillation vials containing hydrogen-3 or carbon-14 must be placed in containers which are labeled with the type and total activity of each radionuclide, concentration, and type of scintillation fluid.

Mixed CSM and radioactive waste must be decontaminated to the 3X level and then placed in an approved radioactive waste storage site. Because this waste cannot be incinerated to the 5X level in the USACBDA incinerator, it must remain under Government control.

Presently, all radioactive wastes (including animal carcasses) generated at USAMRICD are buried at approved disposal facilities. Should the cost of land disposal become prohibitive, USAMRICD may optionally perform sanitary sewer disposal of low level waste as permitted under the terms of the NRC license and NRC regulations (Casole,, 1992f).). The current NRC license permits USAMRICD to incinerate animal carcass wastes containing hydrogen-3 and carbon-14 less than or equal to 0.5 microcuries/gram animal weight.

To date, USAMRICD has not disposed of low level radioactive wastes via the sanitary sewer. The USAMRICD NRC license contains a provision that would allow such disposal. Title 10 CFR Parts 20.303 and 20.306 also allow the disposal of these materials within strict limits established in the regulation. The regulation states that the rule, however, does not relieve the licensee from complying with applicable federal, state, or local regulations governing any other toxic or hazardous property of these materials. USAMRICD cannot dispose of these wastes without meeting the strict requirements of NRC regulations and without the concurrence of the APG Installation Directorate of Safety, Health and the Environment.

Waste containing radioactive material as well as CSM must be handled separately and documentation regarding radioactivity as well as chemical agent category must accompany this type of waste (SOP Number 87-335-VA-12). If decontaminated chemical waste contains any one of the chemicals listed in COMAR 26.13.02.24, Hazardous Constituents, MDE,, it must be collected separately and not mixed with other wastes (Annex A SOP Number 87 335-VA-12).

2.5.6 Animal and Medical Waste

All animal and medical wastes (except those exposed to radioactive material) generated by USAMRICD activities must be incinerated on-site. The USAMRICD medical waste incinerator is an oil-fired Burn-Zol Model 272. The incinerator was placed in service in 1982 and has the capacity to burn 375 pounds of waste per hour. It is the only incinerator of its type in the Edgewood Area Operation of the incinerator must be in accordance with USAMRICD SOP Number 20 (Incinerator Operation). The Chief of the Veterinary Medicine and Surgery Branch is responsible for assuring compliance with the content and implementation of the SOP. In addition to processing waste from USAMRICD,

Table 2-3 Material Incinerated in the USAMRICD Medical Waste Incinerator (Data taken from USAMRICD, 1992)

MATERIAL	Pounds/Year		
	1989	1990	1991
Animal Bedding	78,194	110,150	117,000
Animal Carcasses	23,200	18,380	12,624
Laboratory & Medical Waste	1,758	1,836	3,440
Totals	103,152	130,166	136,064

wastes from USACBDA,, the U.S. Army Environmental Hygiene Agency (AEHA), the Edgewood Area Health Clinic (part of the Kirk Army Medical Clinic) are also incinerated. Material arrives at the facility packaged in red plastic bags labeled with the contents. Animal bedding, consisting of soiled coarse sawdust and ground corn cobs generated at USAMRICD, is dumped from the cages at a central point into hoppers which are taken to the incinerator. Animal carcasses, used animal bedding, used needles and syringes, expired drugs or pharmaceuticals, and the wastes generated in animal treatment rooms and the surgery suite must be disposed of in the medical waste incinerator (Table 2-3). Discarded syringes, needles and items capable of puncturing the skin (sharps) must be placed in special hard-walled single-use containers. Incineration of non-medical waste or non-USAMRICD medical wastes must have the prior approval of the Chief of the Veterinary Medicine and Surgery Branch. Medical wastes incinerated for activities which are not located on the Edgewood Area of APG must be accompanied by a Maryland Special Medical Waste Manifest. The waste stream typically consists of 15 to 20 percent animal carcasses/parts, 70 to 80 percent soiled animal bedding, and 10 to 15 percent medical wastes (Table 2-3). Prior to incineration, animal carcasses must be stored in the coolers in either room 180 in Building E3081 or in the designated cooler in Building E3100.. Animal carcasses are transported to the incinerator by the Animal Caretakers.

Incinerator operators must receive annual training and certification. They are responsible for the maintenance, use, and cleaning of the incinerator as well as maintaining the Incinerator Log Book (as detailed in SOP Number 20) kept in Room 171 of Building E3081.. The log contains the time at which the incinerator was charged, information regarding the types and source of the waste being incinerated, number of containers, and an approximation of the weight of material being incinerated.

The incinerator is brought to operating temperature in the morning and remains running all day. Material is incinerated as it arrives at the facility with a one to two hour interval between changes. The incinerator is left running at the end of the day with an automatic four hour cool down period. The incinerator operates eight hours a day (plus four hours cool down), five days a week (260 days a year). The incinerator is busiest on days when cages are cleaned (Monday, Wednesday, Friday). Ashes are removed manually from the incinerator's primary chamber at least once weekly. Three 30-gallon drums of dry ash are generated weekly (U.S. Army Medical Research Institute of Chemical Defense, 1990) from this medical waste incinerator. Ashes are sent to the Harford County (Scarboro) Landfill (SOP Number 20; Valdivia, 1991; Woodard,, 1991). Several samples of the ash have been tested using the Toxicity Characteristic Leaching Procedure (TCLP) and are not a hazardous waste as defined by RCRA (U.S. Army Medical Research Institute of Chemical Defense, 1990). Dust is collected and emptied from the silo at least once every three months and is incinerated.

This incinerator is inspected yearly and is permitted by the State of Maryland (Permit Number 12 00082). The operation of the incinerator is regulated by COMAR 26.11.08 (Control of Incinerators). Photocopies of the permit history and the results of the State of

Maryland inspections are included as Appendix E. The incinerator has been compliant with applicable State of Maryland regulations and has never been denied permit renewal. Permit requirements for the incinerator include operation of the primary chamber at a minimum temperature of 1,000 degrees Fahrenheit and the secondary chamber at a minimum of 1,800 degrees Fahrenheit. The State of Maryland has permitted the incinerator to process up to 780,000 pounds of waste per year. Periods of excess emissions must be reported to the Maryland Department of the Environment (MDE) (COMAR 26.11.01.07).

As an existing emissions source, the incinerator is subject to restrictions only for particulate emissions. The incinerator must emit less than 0.100 grains/dry cubic foot. One measurement was made on the USAMRICD incinerator in 1983, and the emission was estimated at only half (0.051 grains/dry cubic foot) of the maximum allowed. The incinerator is not subject to the more rigorous standards for particulates and other air pollutants imposed on new emission sources (Kerpelman,, 1992) (see Section 4.1.5). It is not equipped with air pollution control devices.

The incinerator has received periodic maintenance since being placed into service. The incinerator remains operational, but deterioration has been observed on the inner portions of the stack (refractory tiles). USAMRICD has determined the most cost-effective measure is to replace the incinerator with a newer model. The cost to repair and retrofit the Burn-Zol is greater than installing a new, more efficient incinerator.

Plans are currently underway to replace the existing incinerator. The new incinerator is expected to operate six to eight hours per day, three to five days per week for 52 weeks per year. This new incinerator will be equipped with automatic feed and ash removal features and will also have two combustion chambers operating at 1,400 and 1,800 degrees Fahrenheit to assure complete destruction of any products of incomplete combustion (see Section 4.1.5). The new incinerator will be located next to the existing Burn-Zol.

The potential environmental impacts of the new incinerator were evaluated in separate NEPA documentation (U.S. Army Medical Research Institute of Chemical Defense, 1990). The EA of the new incinerator underwent public review and no concerns were raised by the public. This EA concluded that construction and routine operation of the new incinerator would not significantly impact the environmental quality of APG.. Instead, the new incinerator will likely result in reduced air emissions when compared to the old incinerator (see Section 4.15).

An application for a construction permit for the new incinerator was submitted to MDE in November 1990. During the approval process, MDE changed the standards for particulate emissions (April 1991) which required modification to the pollution control equipment on the new incinerator. APGSA submitted a revised construction permit application to MDE on April 22, 1992. The MDE approved the permit application and issued a Permit to Construct on June 18, 1992. Construction began July 7, 1992. Upon completion of construction, the contractor will conduct trial burns, as required by state and

Table 2-4 Fuel Consumption by the USAMRICD Incinerator (Data from Valdivia, 1992c)

Annual Incinerator Fuel Consumption	1989	1990	1991
Oil Consumption	30,730 gallons	31,483 gallons	34,282 gallons
Propane	300 pounds	350 pounds	400 pounds

federal regulations, and submit all test results to MDE.. With satisfactory results, MDE will issue a Permit to Operate for the new incinerator. Once the new incinerator is operational and permitted, the existing Burn-Zol incinerator will be removed from service and demolished.

Five underground storage tanks are located in the vicinity of USAMRICD.. Four tanks are located outside of E3081. Three of these tanks hold fuel oil - one for the operation of the medical waste incinerator and two for the operation of emergency generators within E3081. The fourth tank outside of E3081 was installed but never put into use. The fifth underground storage tank is located outside of building E3100 and holds fuel oil for the powering of the emergency generators for that building. The APGSA Directorate of Engineering and Housing monitors the integrity of these tanks as mandated by the State of Maryland. The underground storage tanks are pressure tested annually (Schafer, 1992).

The USAMRICD medical waste incinerator is fueled by both fuel oil and propane (Table 24). Propane is provided in 100 pound cylinders which are stored outdoors in the cylinder cage storage area near the northeast corner of E3100.. Also located in this cylinder cage storage area is a 1,000 gallon propane storage tank Propane from this tank is also piped through the building for use in laboratories (Schafer, 1992).

2.6 Accident Response

In emergency situations the protection of materials or equipment is secondary to the protection of personnel (USAMRICD Memorandum Number 385-1). Specific guidance available for various types of emergencies which might occur within USAMRICD includes "Fire Prevention and Protection Program" (APGR 420-1), "Evacuation Procedures for Buildings E3100,, E3101,, e3103,, E3105,, and E3244" (USAMRICD Memorandum Number 420-2), and "Evacuation Procedures for Building E3081" (USAMRICD Memorandum Number 420-3) (USAMRICD Memorandum Number 385-1).

2.7 Accident Investigation

Employees are required to report all injuries and accidents to their supervisors. Supervisors are responsible for informing the Safety and Chemical Operations Branch of all incidents and accidents. All injuries and accidents require an analysis and the immediate implementation of any appropriate corrective measures. Written reports including STE Form 1416 (Record of Injury), DA Form 285 (U.S. Army Accident Investigation Report) and, if appropriate, CA-1 (Federal Employees Notice of Traumatic Injury and Claim for Continuation of Pay Compensation) or CA-2 (Federal Employee's Notice of Occupational Diseases) must be filed with the Safety and Chemical Operations Branch within seven working days of the accident or injury (USAMRICD Memorandum Number 385-1).

Accidents or incidents involving chemical agent must be reported immediately by activating a "panic button" located in the BB exclusion area and by dialing "17" on the telephone. These actions will initiate the emergency plan detailed in (USAMRICD Memorandum Number 420-3 (Evacuation Procedures for Building E3081) (AR 50-6). These actions are in accordance with AR 50-6 and The Chemical Accident/Incident Control Plan Annex C to Appendix I of the APG Disaster Control Plan (USAMRICD Memorandum Number 385-1).

2.8 Orientation and Training

All laboratory work involving hazardous materials at (USAMRICD must tee performed under established SOPs. These SOPs describe the safe and proper operation of every potentially hazardous activity conducted at (USAMRICD and incorporate requirements established under federal, state, local, and institutional regulations.

Materials for safety orientation and training are available from the Safety and Chemical Operations Branch of (USAMRICD. All personnel involved in operations which require adherence to an SOP must be trained in that procedure by an appropriate individual assigned to that task by either the Branch Chief or a supervisor (USAMRICD Memorandum Number 385-1). General training relevant to all laboratory personnel, such as training in the use of radioactive materials and general laboratory safety, is part of a general training plan developed and implemented through a joint effort of the (USAMRICD Training Coordinator and the Safety and Chemical Operations Branch. Documentation of this training must be obtained from both the employee and the supervisor (USAMRICD Memorandum Number 385-1).

Projects involving the use of biological toxins must be supervised by PIs formally trained and holding appropriate credentials for supervision of the specific laboratory work. Staff members working with biological toxins have a level of competency which equals or exceeds the standards for a Biological Laboratory Technician or have completed Clinical Laboratory Technician Training (USAMRICD Memorandum Number 385-1).

Employees working with or in the vicinity of toxic chemical agents must participate in a Toxic Aid Briefing at least one time per year. Individuals involved in the use of CSM must participate in ongoing activities designed to maintain and enhance their ability and proficiency in first-aid techniques and evacuation procedures (USAMRICD Memorandum Number 385-1). For additional details regarding training and orientation in the use of chemical surety materials see Section 2.4.1.

2.9 Safety Inspection and Monitoring

The Safety and Chemical Operations Branch inspects (USAMRICD facilities. These inspections must comply with Standard Army Safety and Occupational Health Inspections (USAMRICD Memorandum Number 385-1). Supervisors must inspect work areas and operating conditions to ensure that personal protective clothing and equipment are in use and functional; that safety devices are available, functioning, and in use; and that all hazards are appropriately minimized. For information on the monitoring of the engineering controls of chemical agent operations see Sections 2.4.1 and 2.45.

General chemistry laboratories and XCSM laboratories are inspected quarterly. The CSM laboratories must be inspected monthly. Industrial and administrative areas must be inspected annually. Chemical surety inspections are mandated by AR 50-6. These comprehensive inspections review all of the practices and procedures of (USAMRICD including activities having chemical surety responsibilities. The Inspector General is responsible for conducting and assigning to Major Army Commands the responsibility for chemical surety inspections, reviewing the reports, and conduct of chemical management evaluations. Chemical surety inspections scheduling must be coordinated with Headquarters, DA.

2.10 Special Considerations

2.10.1 Medical Monitoring of Personnel

All civilian, military, and visiting personnel working within (USAMRICD and having the potential for exposure to chemical or toxic materials are required to undergo physical examinations prior to commencing such work assignments and at regular intervals thereafter (USAMRICD Memorandum Number 385-1). Any individual working with or in the proximity of chemicals which are potentially lethal or incapacitating (such as CSM or other hazardous substances) must provide proof of medical clearance to the Safety and Chemicals Operations Branch. Personnel who have access to laboratories that operate with nerve agent (either neat or XCSM) are required to have a baseline cholinesterase level determination followed by annual monitoring which is compared to this baseline level (USAMRICD Memorandum Number 385-1; Martin and Woodard, 1991). A reduction in the level of this enzyme may indicate that exposure to a nerve agent has occurred. Significant changes in serum cholinesterase levels result in adverse nervous system effects. When employee work assignments no longer provide potential exposure to CSM,, hazardous or incapacitating chemical agents, or other hazardous materials they must be given a termination physical examination before being removed from the Safety and Occupational Health Program (USAMRICD Memorandum Number 385-1). Personnel who have access to the areas where non-human primates are housed or who work with non-human primates must be tested for tuberculosis annually since this disease is transmissible between non-human primates and humans (Martin and Woodard, 1991).

Personnel working with known or suspected carcinogens must be medically cleared before commencing work with these chemicals. In addition, the known or suspected carcinogens with which they work must be listed on their medical records (USAMRICD Memorandum Number 385-1). Employees working with known or suspected carcinogens are required to receive an annual physical examination.

Maintenance procedures or facility modifications which occur in an exclusion area or in an area where hazards are present must be coordinated with the Chief, Safety and Chemical Operations Branch, to assure that the proper health and safety controls and any associated permitting procedures are implemented (USAMRICD Number 385-1).

Some individuals who work with radioactive material must wear thermoluminescent dosimeters which measure absorbed doses of radiation. According to SOP Number 90-282RSM (Radioactive Material Safety SOP), workers who are using hydrogen-3, carbon-14, or calcium-45 are not required to wear radiation monitoring badges. Those working with phosphorus-32, sulfur-35, iodine-125, and cesium-137 must wear badges at all times during their work. Workers may not be assigned duty requiring the use of radioisotopes or having the potential for exposure to radioactive materials until they have undergone a radiation physical examination and participated in the training required by SOP Number 90-282-RS Work areas must be monitored daily by either survey meter or wipe test to check for any accidental contamination which may have occurred. The results of these monitoring surveys must be kept in a log as required by NRC regulations.

Workers who use one or more millicuries of iodine-125 at any given time are required to have a thyroid scan conducted within one week of the work with this amount of the radioisotope. Workers using hydrogen-3 in amounts of 100 millicuries or more at any given time are required to have a urine assay performed within one week of their potential exposure (SOP Number 90-282-RS 04).

2.10.2 Use of Recombinant DNA

Two protocols are currently approved for the use of recombinant DNA deoxyribonucleic acid). The U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) Institutional Biosafety Committee (IBC) evaluated proposals for these research projects in accordance with federal and Army regulations. USAMRIID has been involved in this protocol evaluation process because of its expertise in this type of research (Foster, 1992)

Recombinant DNA is a product of the laboratory manipulation of DNA in which DNA molecules or fragments of DNA molecules from various sources (natural or synthetic) are broken apart and recombined through the use of enzymes and then introduced into a diving eel] for replication. The methods involve manipulating the recombinant DNA molecules and the organisms, cells, and viruses containing these molecules. Work involving recombinant DNA methods is conducted according to the safety procedures found in Guidelines for Research Involving Recombinant DNA Molecules (Federal Register, 1986) and recommendations of the USAMRIID IBC..

Infectious organisms are not employed in the recombinant DNA work performed at (USAMRICD. Research involving recombinant DNA is strictly controlled through the use of approved SOPs and by strict adherence to the Guidelines for Research Involving Recombinant DNA Molecules (Federal Register, 1986). Additionally, any protocol involving recombinant DNA work at the (USAMRICD must be approved by a biological safety committee. Recombinant DNA work is performed under strict engineering controls (i.e., properly filtered, certified fume hood, or biological safety cabinet). There is no special or new waste stream generated by these activities.

2.10.3 Animal Care and Use

Guinea pigs, rats, mice, rabbits, sheep, goats, and swine are used at (USAMRICD. (USAMRICD also maintains a large inventory of primates. There are currency 415 primates (9 Cynomologous monkeys and 406 Rhesus monkeys) (Valdivia,, 1992c).). The Veterinary Medicine Division plans to receive an additional 200 Aeotus primates sometime during the spring or summer of 1992 (Valdivia 1992c).). During 1990, the (USAMRICD procured 25,710 laboratory animals in support of 54 animal use protocols. The Veterinary Medicine and Surgery Branch provided complete veterinary care to the Institute laboratory animal population of 1,348 (U.S. Army Medical Research Institute of Chemical Defense, 1991).

USAMRICD uses only the minimum number of animals necessary to obtain statistically valid experimental results and the animal species most appropriate to the experimental objective. All proposed research must be described by a protocol or pilot protocol in accordance with (USAMRICD Memorandum Number 70-9 (Research, Development and Acquisition Research Protocols). (USAMRICD Memorandum Number 70-9 requires extensive review of all aspects and implications of protocols and pilot protocols prepared for work to be performed or sponsored by (USAMRICD. This review includes examination of the justification for use of animals by the LACUC. Research protocols must be reviewed and approved by the Branch Chief, Division Chief, Chief of the Research Operations Division, the Chairman of the LACUC, and the Commander, (USAMRICD.

The (USAMRICD must comply with all laws and regulations pertinent to laboratory animal care and use. Care and maintenance of laboratory animals must follow guidelines set forth in the Laboratory Animal Welfare Act (9 CFR 14). The American Association for Accreditation of Laboratory Animal Care (AAALAC), a non-federal, private organization (Appendix F), certifies the animal facilities at USAMRICD. This certification is reevaluated every three years. USAMRICD has been AAALAC certified since 1984 and was evaluated by AAALAC during the summer of 1992. USAMRICD's 1989 accreditation remains in effect and receipt of credentials acknowledging continued AAALAC accreditation is anticipated by November, 1992 (Casole, 1992g). The approval process determines whether animals receive adequate veterinary care, engineering systems are appropriate and adequately maintained to ensure proper temperature and ventilation, occupational safety and health programs are in place for all of the workers who have contact with animals, investigators are properly trained in the care and use of animals, and experimental protocols are appropriate.

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3.0 ALTERNATIVES CONSIDERED

3.1 Programmatic Alternatives

During preparation of this EA,, three alternatives were The range of alternatives included continuation of MCDRP and medical BDRP operations in their present scope at (USAMRICD (Alternative III) or elsewhere (Alternative I) and the cessation of all operations presently performed at (USAMRICD Alternative II).

These alternatives underwent a two-tiered analysis. First, the alternatives were examined for the impact that they would have upon the MCDRP and the medical BDRP missions. Second, they underwent an initial examination to determine the effect, positive or negative, that their cessation would have upon the environment. If upon conclusion of this analysis, it was determined that cessation of an operation would 1) render the MCDRP or medical BDRP missions ineffective, and 2) would not materially improve (USAMRICD operation reduce resource utilization or reduce potentially adverse impacts, then the alternative was considered unreasonable.

The (USAMRICD operations that involve the use of CSM and toxins are considered to be so essential to the overall MCDRP and medical BDRP missions of meeting and negating, through medical measures, existing and future threats to U.S. forces that their cessation would render these programs ineffective. At the same time, the potential adverse environmental impacts resulting from research involving the use of these materials (both at the time of the initial two-tiered analysis and after the intense examination of this EA) are considered to be of such an insignificant nature that the cessation of these activities would not improve (USAMRICD operations or reduce adverse impacts. Consequently, the material-specific no action alternatives of ceasing work with CSM,, biological toxins, radioactive materials, and chemical carcinogens were each determined to be unreasonable alternatives. Each is, nevertheless, a component of the no action alternative (Alternative II).

The three alternatives that encompass the range of alternatives examined within this EA follow.

3.2 Alternative I - Transfer the USAMRDC Sponsored Work at (USAMRICD to Another Location

This alternative entails continuing the work conducted at (USAMRICD at a different location within or outside of its present geographical location. This alternative would suspend that part of the MCDRP and medical BDRP efforts performed at (USAMRICD and transfer these operations to other existing or planned facilities.

3.3 Alternative II - No Action Alternative

The no action alternative is to cease the work performed by (USAMRICD.

3.4 Alternative III- Continue the Operation of (USAMRICD in its Present Scope

This alternative involves continued operation at this location in its present scope. This alternative is considered to be the preferred option since the present efforts at (USAMRICD are considered essential to the MCDRP and medical BDRP missions and are authorized by Congress.

4.0 AFFECTED ENVIRONMENT

4.1 Environmental Setting

(USAMRICD is located within APG in the southern portion of Harford County, Maryland (Figure 2-2). The total surface area of APG is 79,284 acres, but approximately half of this area is submerged or off-shore. APG is divided into the Aberdeen Area and the Edgewood Area (Figure 2-1). The Edgewood Area is immediately adjacent to the community of Edgewood and approximately 12 miles south of the Town of Bel Air, the county seat. Other major incorporated areas in Harford County include Aberdeen and Havre de Grace. The county is bordered on the southeast by Chesapeake Bay and the northeast by the Susquehanna River. The majority of the western boundary of Harford County with Baltimore County to the west is formed by Little Gunpowder Falls. USAMRICD is located approximately 30 miles northeast of Baltimore. The portion of APG where USAMRICD is located is a peninsula known as Gunpowder Neck. It is located on the mid-eastern portion of the peninsula approximately 500 feet west of Kings Creek and immediately east of Weide Army Air Field (Figure 4-1 and Figure 4-2). Kings Creek is a tributary of the Bush River which discharges into the Chesapeake Bay.

All research and administrative activities of USAMRICD are located within the facility complex. Support functions such as wastewater treatment are provided by APGSA. Environmental characteristics of the area around USAMRICD are presented in subsequent sections. More detailed descriptions of the environmental setting of APG and (USAMRICD are provided in other NEPA documentation (Department of the Army, 1988; Advanced Sciences, 1990). There is little probability that operations at USAMRICD will have a negative impact on most of these environmental components.

4.1.1 Land Use

The existing land use pattern at APG conforms to the current and future plans for development within Harford County. Harford County, Maryland, regulates off-post land use within the vicinity of USAMRICD Harford County maintains a Comprehensive Development Plan, establishes zoning ordinances, and regulates development on lands within its jurisdiction, including land adjacent to the installation boundaries. The Harford County Land Use Plan has designated the area bounded by State Routes 24 and 924 north to State Route 23 as a development envelope (Figure 4-3). Development in this area is favored over other portions of the county. The region surrounding APG is comprised of agricultural, commercial, and residential areas.

Land use patterns on APG are detailed in the Installation Master Plan (Planning Branch of the Engineering Plans and Services Division, Directorate of Services). The land area where USAMRICD is located is part of an area originally designated as the Gunpowder Reservation in 1917. Gas shells containing chemical agents were produced at the installation during WWI. The name was changed to the Edgewood Arsenal in 1919. Vast quantities of munitions were produced during WWII. In 1971 the Edgewood Arsenal

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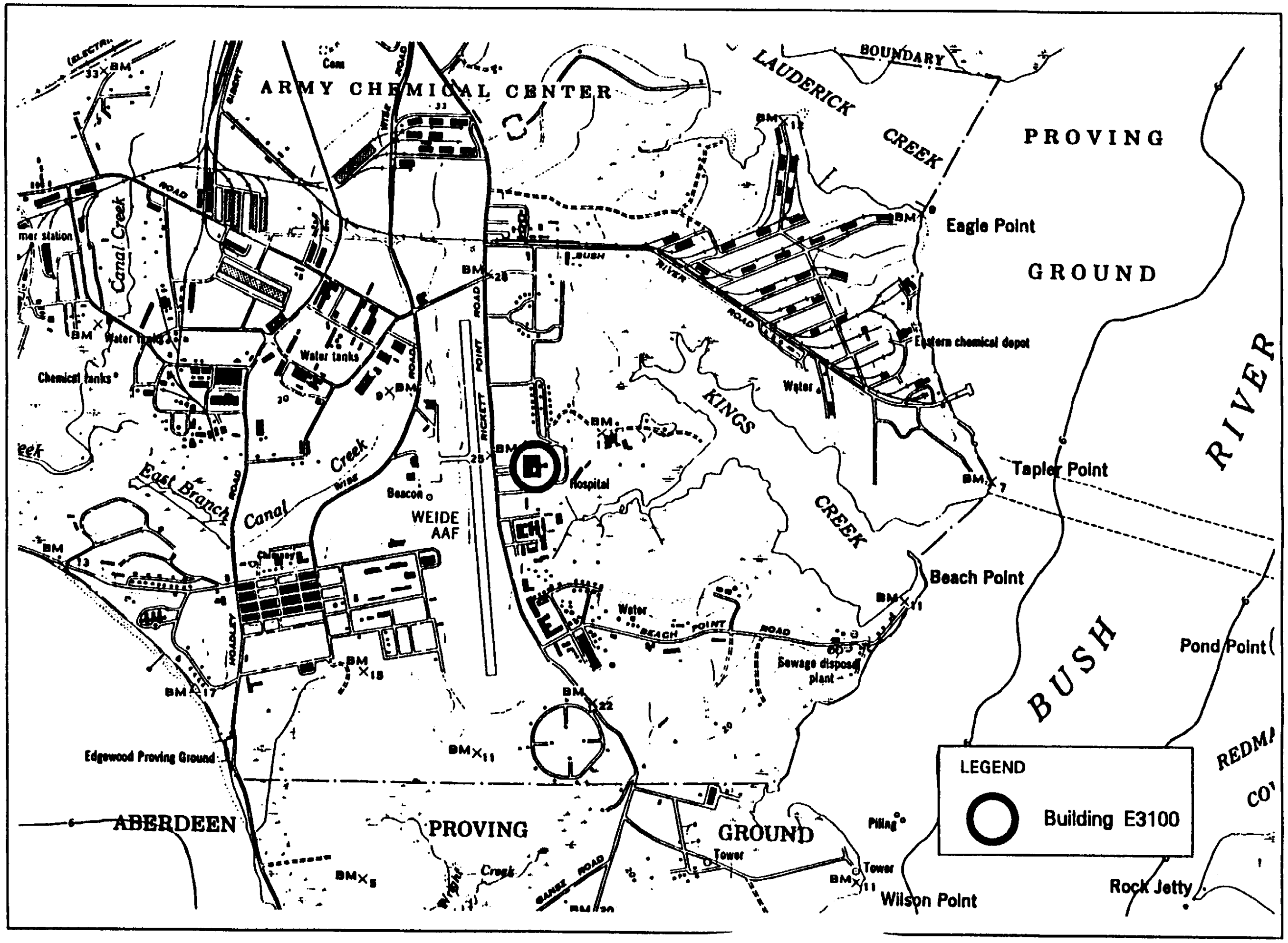

Figure 4-1 Location of USAMRICD within the Edgewood Area

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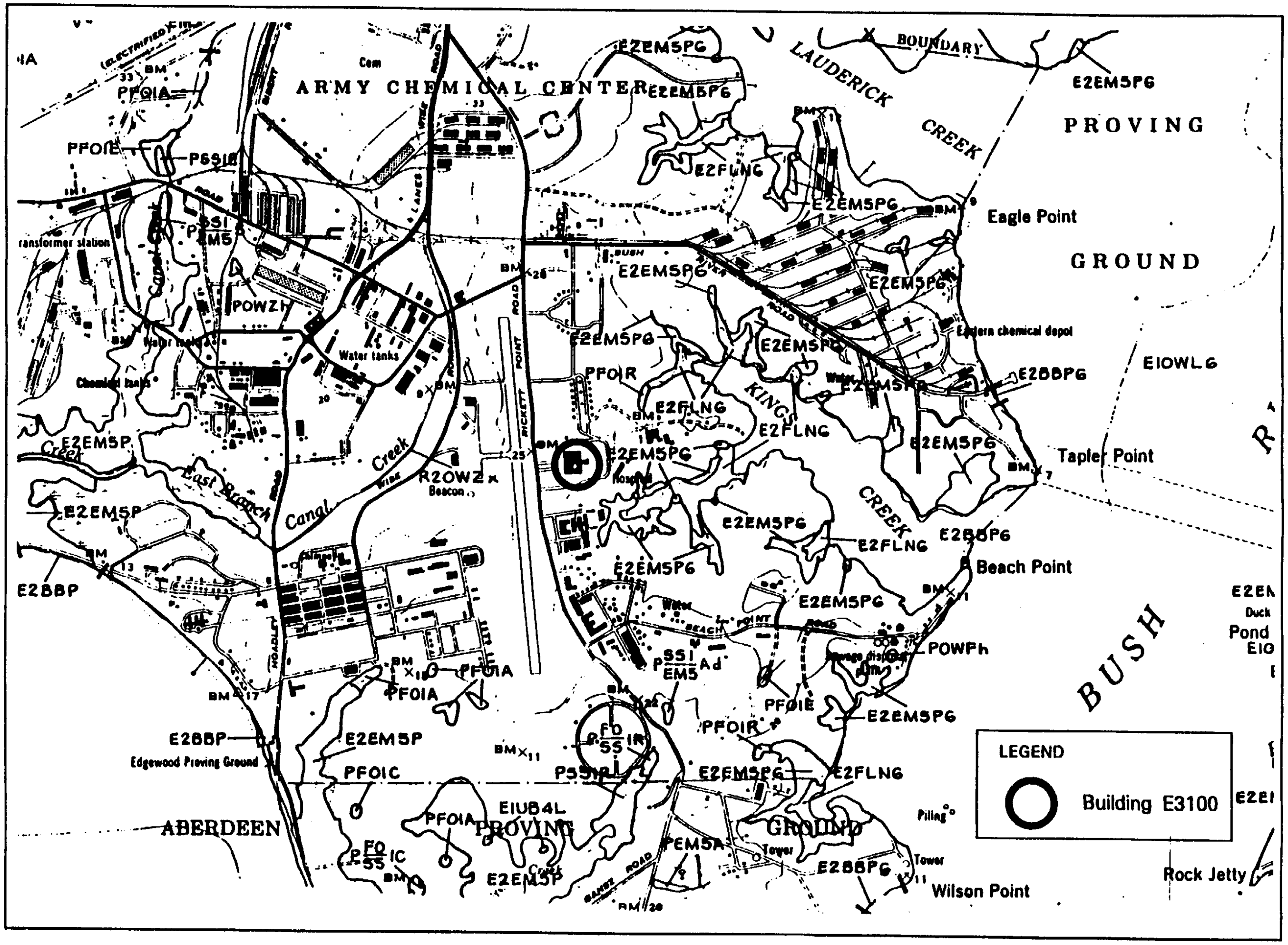

Figure 4-2 Portion of the Wetland Inventory Map for the Edgewood Area of Aberdeen Proving Ground, Maryland

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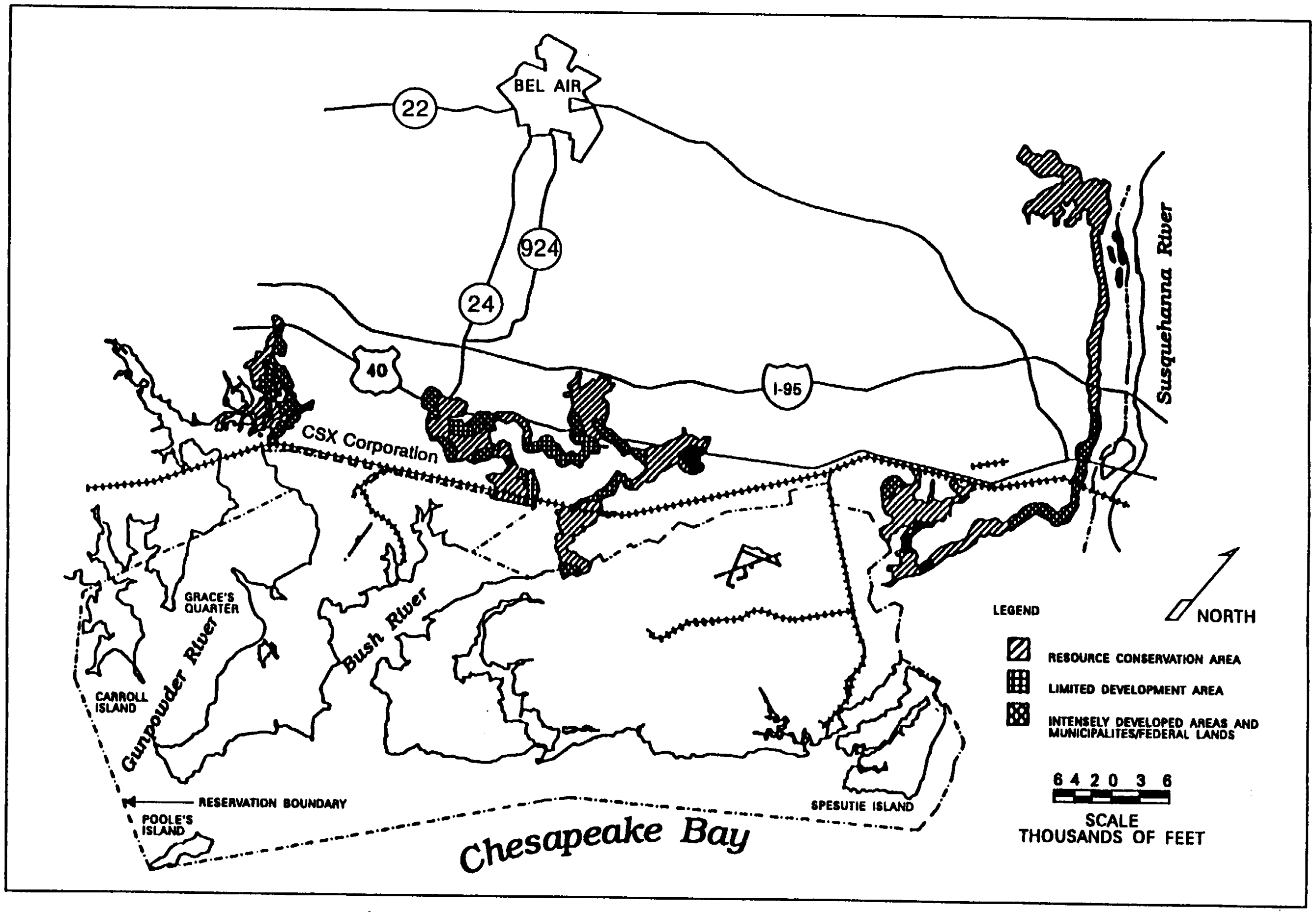

Figure 4-3 Harford County Land Use Plan for Selected Areas Near Aberdeen Proving Ground, Maryland

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was incorporated into APG. Past activities at APG have included ordnance testing and testing of chemical agents. Past disposal practices for chemical materials, ordnance, and other substances have left large portions of APG contaminated. APG was proposed for the National Priority List (NPL) in 1984. The NPL consists of hazardous waste sites deemed by the U.S. Environmental Protection Agency to be the most in need of remediation efforts. APG was officially placed on the NPL on February 21, 1990 (Hurst, 1992). Currently more than 80 percent of APG is used for ordnance testing and vehicular testing. Consequently, past and present activities at APG limit access to most areas of the installation. There are no plans to change land use patterns on APG.

USAMRICD is located in an area of APG currently containing a major concentration of research, industrial operations, and maintenance activities housed in 34 major buildings. The area of APG where the USAMRICD facilities complex is located was originally a part of Fort Hoyle and was used for training. During WWII more than ten structures were constructed for use as medical research laboratories. These structures are currently used as chemical research laboratories. A hospital complex also was constructed on the land currently occupied by the USAMRICD facilities complex. This complex was used primarily for support of medical research during the post WWII period. The hospital was demolished in the late 1960s and Building E3100 was constructed. Building E3081 was constructed in the late 1970s, and operations began in 1979 (U.S. Army Environmental Hygiene Agency, 1989).

4.1.2 Plant and Animal Ecology

The distribution and abundance of wildlife within a geographical area are dependent upon soil type and quality, availability of vegetation and shelter, as well as human land use patterns. APG is located within the Atlantic Coastal Plain Physiographic Province and adjoins the Chesapeake Bay, the Gunpowder River, and Bush Creek. The northern portion of APG is adjacent to the Susquehanna National Wildlife Refuge. As a result, APG has a variety of terrestrial and aquatic habitats which are inhabited by a diversity of animal and plant species (Appendix G). The surface area of APG is roughly equally divided between terrestrial (56 square miles) and aquatic (57 square miles) habitats. Little virgin land is left on APG. The land occupied by APG was cleared and utilized for truck crops prior to 1917. As military missions have changed since that time, some areas of APG have been allowed to return to woodlands. Other areas are maintained as cleared land. Consequently, the four major habitat types now found in the Edgewood Area of APG include meadows (cleared areas), woodlands, swamp, and tidal marsh. The latter two habitats are considered as wetlands. Thirty-eight percent of APG is occupied by woodlands and 42 percent is maintained as cleared land. The remaining 20 percent is swamp and tidal marsh (Figure 4-4).

4.1 2.1 Woodlands

The woodlands of APG consist primarily of hardwoods. The dominant trees in woodlands habitats are sweet gum oaks and water oaks. Within APG, 15,400 acres are

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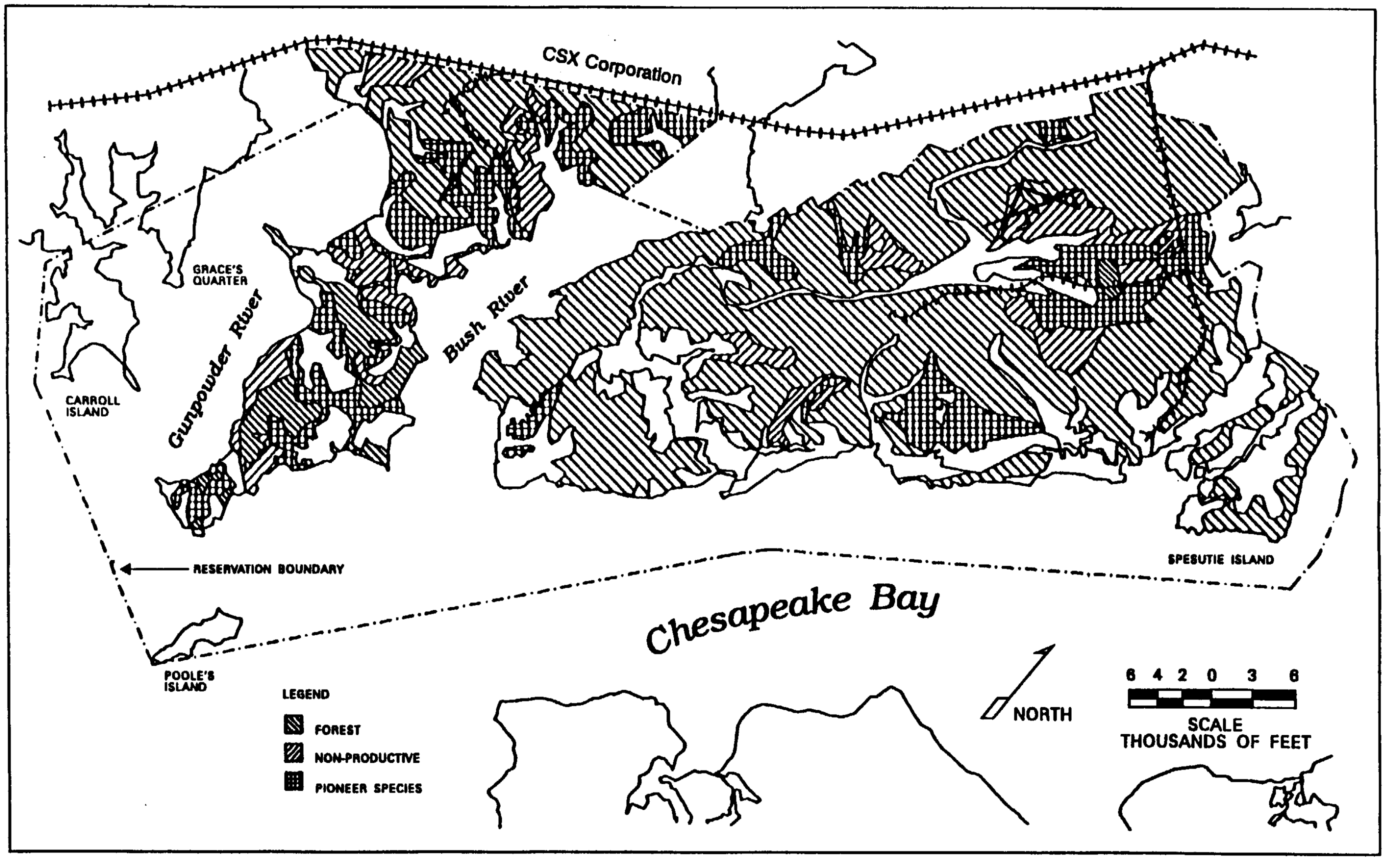

Figure 4-4 Approximate Distribution of Vegetation Cover on Aberdeen Proving Ground, Maryland

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classified as forested. Approximately 5,200 acres of the forested regions are managed by selective cutting. The majority of these forest areas may be classified as wetlands since the high water table results in waterlogged soils.

4.1.2 Meadows

Meadows (mowed areas) cover 34 percent of the surface of APG and consist of various grasses and fortes. These habitats are periodically mowed. Of this 34 percent, 23 percent is mowed once or twice a year (maximum height 1 to 3 feet) while the remaining 11 percent is mowed more frequently (maximum height six inches). Cleared areas contain a mixture of grasses and herbaceous weeds.

4.1.2.3 Swamps and Tidal Marshes

Wetlands are areas which are continually or periodically flooded. Wet soils have various chemical and physical characteristics and are occupied by a wide variety of plant communities. Wetlands are valuable for flood control, as nutrient sinks, and provide breeding grounds for some fish and waterfowl species. The APG wetland habitats provide food and shelter for ducks, geese, herons, shore birds, muskrat, mink, and beaver. These open, shallow water areas may be marsh or swamplike and contain numerous species of annual and perennial herbaceous plants. The marsh areas drain into the freshwater creeks and low salinity estuaries. Approximately 6,000 acres of marshland are on APG. These areas are periodically flooded or water-logged and may be either freshwater or estuarine depending upon their proximity to the Chesapeake Bay and river mouths. A variety of herbaceous plants are associated with these freshwater and brackish marshes (Appendix G). U.S. Fish and Wildlife Service (USFWS) National Wetlands inventory maps indicate numerous wetland habitats are present within several miles of the (USAMRICD building complex (U.S. Fish and Wildlife Service, 1982). The edge of the nearest wetland is approximately 500 feet from Building E3100 and Building E3081 (Figure 4-2).

The Chesapeake Bay is one of the largest estuaries in the world. Nearly half of the freshwater input to the bay originates from the Susquehanna River. Therefore, variations in flow, sedimentation, nutrients, and pollutants in the input from the Susquehanna River strongly influence the Chesapeake Bay ecosystem. APG is located in the portion of the estuary where freshwater and salt water interface. Major accumulations of organic material occur in the sediments of this area This organic matter ultimately feeds a major portion of the food web of the ecosystem. Estuarine organisms such as shrimp, crabs, and fish utilize marsh areas associated with the estuary. The presence of freshwater, brackish, and marine environments on APG provides habitat for a wide variety of fish species (Appendix G). Mudflats are regions forming the interface between open water and terrestrial habitats. They are exposed during periods of low tide and utilized by various bird and mammal species.

4.1.2.4 Wildlife Diversity

Terrestrial areas of APG are inhabited by numerous wildlife species. The most common species of mammals include white-tailed deer, gray squirrel, eastern cottontail rabbit, southern flying squirrel, eastern chipmunk, little brown bat, short-haired bat, muskrat, opossum, striped skunk, white-footed mouse, and masked shrew. Eastern cottontail rabbits are particularly abundant in roadside habitats throughout the installation. Groundhogs (woodchucks) are also numerous and widespread on APG. A list of mammal species potentially found in Harford County and APG is provided in Appendix G.

The deer populations at APG are currently significant. From the mid 1800's to 1932, no deer were known to reside on APG. In 1932 a small number of deer were released on APG. The population increased dramatically, and in 1948 the Maryland Wildlife Administration attempted to reduce the population by trapping and relocating approximately 2,000 deer. Hunting activities have occurred on APG since 1951. The over-abundant deer population has modified the habitat on APG by over-browsing. Grazing activities have reduced conifer and shrub reproduction in many portions of APG. Deer grazing activities have reduced the availability of acorns to other species which use them for food (e.g., squirrel, turkey, quail). The body size of deer on APG is generally smaller on average than deer found in other parts of Maryland.

Beaver were introduced on APG in 1961. Beaver populations have altered habitats by flooding roads and altering drainage patterns. Impounding of water by beaver, however, results in good habitat for waterfowl, otters, bald eagles, and great blue herons.

Trapping and hunting for deer, muskrat, raccoon, red fox, opossum, skunk, and otter are allowed. APG encourages trapping and hunting activities which have a positive impact on wildlife management goals. The main species hunted and trapped, respectively, are deer and muskrat. The average annual harvest of white-tailed deer is between 900 and 1300 deer. More than 4,000 muskrat were taken between 1987 and 1989. Regulation of such activities is provided by APGR 210-5 and various state and federal laws.

At least 38 species of reptiles and amphibians have been recorded on APG. These species include a variety of lizards, salamanders, snakes, toads, and frogs (Appendix G). The majority of amphibians and reptiles are dependent upon wetlands and temporary pools during the larval phase of their life cycle and/or as feeding habitat. Reptiles and amphibians provide an important food source for some mammals and raptorial birds. Salamanders are usually found in moist habitats near marshes and beaver ponds. Frogs, turtles and snakes are probably associated with wetland habitats including old bomb craters which have filled with water. The majority of reptile and amphibian species are inconspicuous during the winter due to burrowing underground or in marsh sediments.

The proximity of APG to many habitat types permits a wide variety of bird species to use the area (Appendix G). The Atlantic Flyway is a migration pathway used during fall and spring. The Chesapeake Bay is associated with the Atlantic Flyway. The Susquehanna Flats is especially well-known for its high abundance and diversity of bird species.

4.1.2.5 Critical Habitats and Species of Special Concern

Critical habitat areas are habitats used by threatened/endangered species and other species of special concern. Land use plans for each county are mandated by the State of Maryland to include designation of critical habitat areas (Maryland State Law; Article 58c, Section 2(b)(1). Activities which may adversely impact the designated area are prohibited.

Threatened and endangered species are protected by county, state, and/or federal regulations. Some species may be locally rare but not threatened or endangered when considered on a national basis. Consequently, the applicable regulations depend on both local and national status for a given species. Federally endangered and threatened species are protected by the Endangered Species Act of 1973 (USC 1531 as amended). The U.S. Fish and Wildlife Service has identified Deer Creek and Gasheys Run as critical habitats for the Maryland darter *(Ethestoma sellare)* (Appendix G). This fish is a federally endangered species and possesses a highly restricted distribution. The only known location for this species is Harford County (Swan Creek, Gasheys Run, Deer Creek). Gasheys Run and Deer Creek are considered to be critical habitats for the Maryland darter. The species requires well-oxygenated waters with low turbidity levels. It is particularly vulnerable to siltation since this may degrade spawning areas. Habitats for this fish species are protected according to the "Recommended Designation of State Critical Areas for Harford County", June 1978. The lower portion of Deer Creek is also used for the spawning activities of the Atlantic sturgeon (regionally rare), the shortnose sturgeon (federally endangered) and the logperch (state highly rare). Deer Creek is adjacent to APG.

A federally endangered species, the bald eagle *(Haliaeetus cephalus),* utilizes the habitat found in Harford County. It is listed on the USFWS List of Threatened and Endangered Plant and Animal Species. The highest concentration of bald eagles on Chesapeake Bay occur on APG (Figure 4-5). The habitat quality for bald eagles is high since the area has both an abundance of food and nesting sites. The period of courtship and egg incubation is the most critical period for bald eagles and occurs generally from January 1 to April 15. In addition to breeding activities, bald eagles also use this area during migration. Bald eagles are associated with timberland near streams and the shore areas along the Chesapeake Bay.

APGSA has an Endangered Species Protection Plan designed to prevent adverse impacts to bald eagle populations on the installation. Nest sites are monitored by APGSA personnel to minimize disturbance during the most critical period (courtship and incubation) for the bird. Other periods are considered to be less critical. All activities are prohibited within a 100 meter radius of the nesting tree. Secondary and tertiary zones extending 200 meters and 400 meters exist restricting human activity. Improvement of bald eagle habitat on APG is encouraged through management of prey species and perch availability. None

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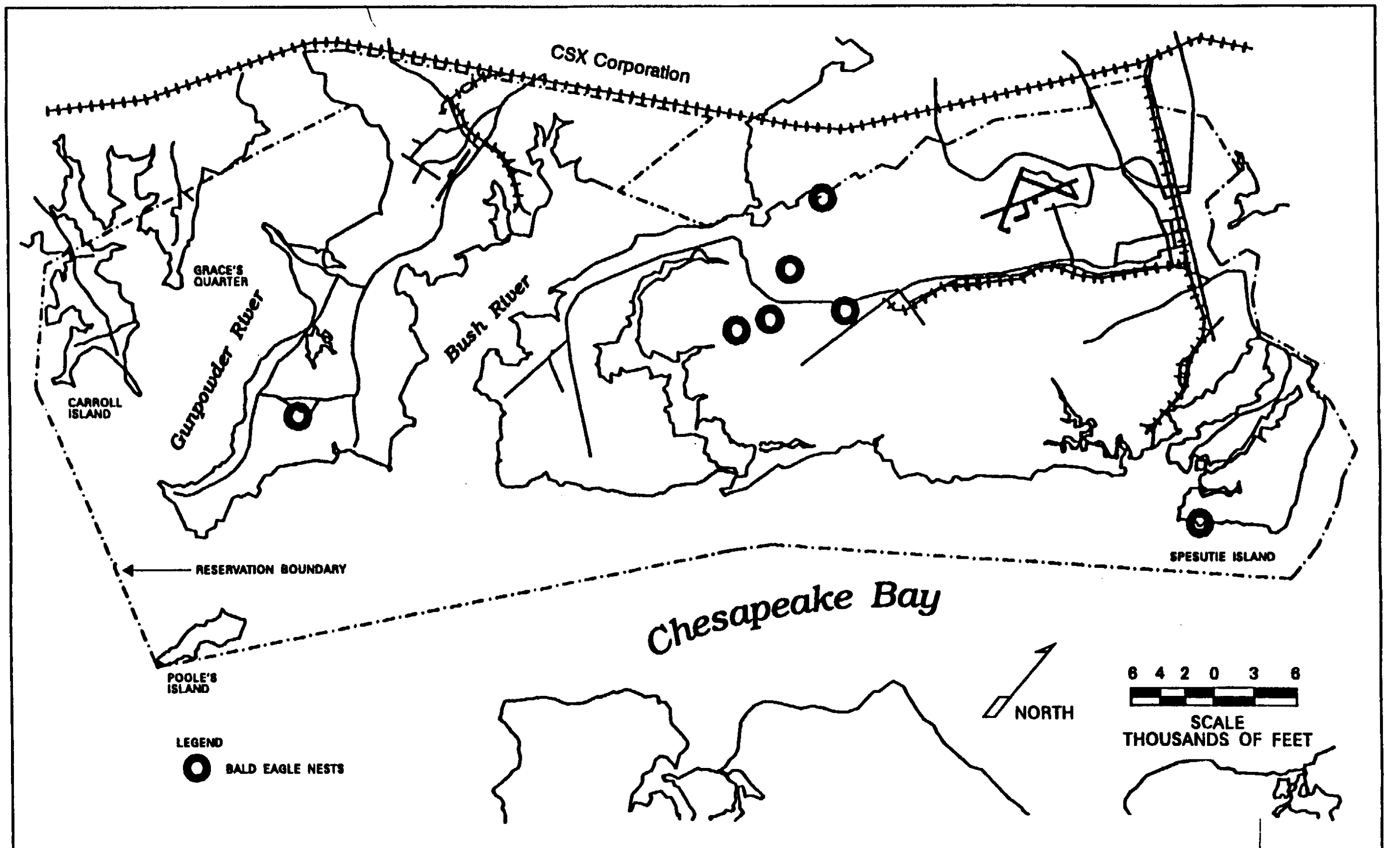

Figure 4-5 Location of Bald Eagle Nests on Aberdeen Proving Ground, Maryland

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of the federally endangered species listed in Appendix G are known to inhabit the area near (USAMRICD (McKegg, 1991).

A number of Maryland -listed endangered, threatened, or species of special concern may a lso utilize the habitat found in Harford County (Appendix G). These organisms may be rare within the State of Maryland but are not considered to be special status species on a national basis. None of the Maryland -listed endangered, threatened, or species of special concern are known to frequent the area near (USAMRICD (McKegg, 1991).

4.1.3 Geology

Harford County is situated in the Atlantic Coastal Plain Physiographic Province adjacent to Chesapeake Bay. This area has lower elevation than the Piedmont Physiographic Province to the north. The boundary between these two provinces is known as the Fall Line and runs from the Susquehanna River to Gunpowder Falls. APG lies approximately three miles southeast of the Fall Line. The highest elevation in Harford County is more than 800 feet at Whiteford in the northern portion of the county lying in the Piedmont Plateau. Elevations in the Atlantic Coastal Plain are as great as 400 feet near the Fall Line in the extreme northern portion of the province. The southern portion of the Coastal Plain is a broad lowland and elevations range from 90 feet near Aberdeen to sea level near the Chesapeake Bay. The elevation of the land where the (USAMRICD facilities complex is located varies between 10 and 20 feet above mean sea level (U.S. Geological Survey, 1985). Harford County has no known active geological faults (Soil Conservation Service, 1975).

A variety of metallic and nonmetallic minerals are found in Harford County. Most of the mineral deposits are located in association with the Fall Line area. These minerals include chromite, feldspar, asbestos, iron, talc, serpentine, basalt, and marble. Hard crystalline rocks underlay the northern area of the county. The Atlantic Coastal Plain is situated above porous and permeable unconsolidated sediment from the Cenozoic and later Cretaceous Period.

The Soil Conservation Service (1975) survey and mapping of Harford County did not include the Edgewood Area Soil contamination and restricted access makes sampling difficult in the Edgewood Area. The U.S. Army Corps of Engineers, Baltimore District, prepared a soils map for APG. This soil map was verified by a limited sampling effort for the Soil Erosion Control Study. Atlantic Coastal Plain soil series dominate the Edgewood Area (Figure 4-6) These soil series originate from marine sediments and include the Sassafras series, the Keyport series, and the Elkton series. The Sassafras and Keyport series are both deep, well -drained soils located in uplands and are nearly level to steep. The Sassafras series has moderate amounts of silt and clay and higher sand content. The Keyport series has a high clay content and moderately high content of silt. The Elkton series are also deep soils with high clay content but are poorly drained compared to the Keyport and Sassafras series. Meadow and tidal marsh areas have mixtures of soil types.

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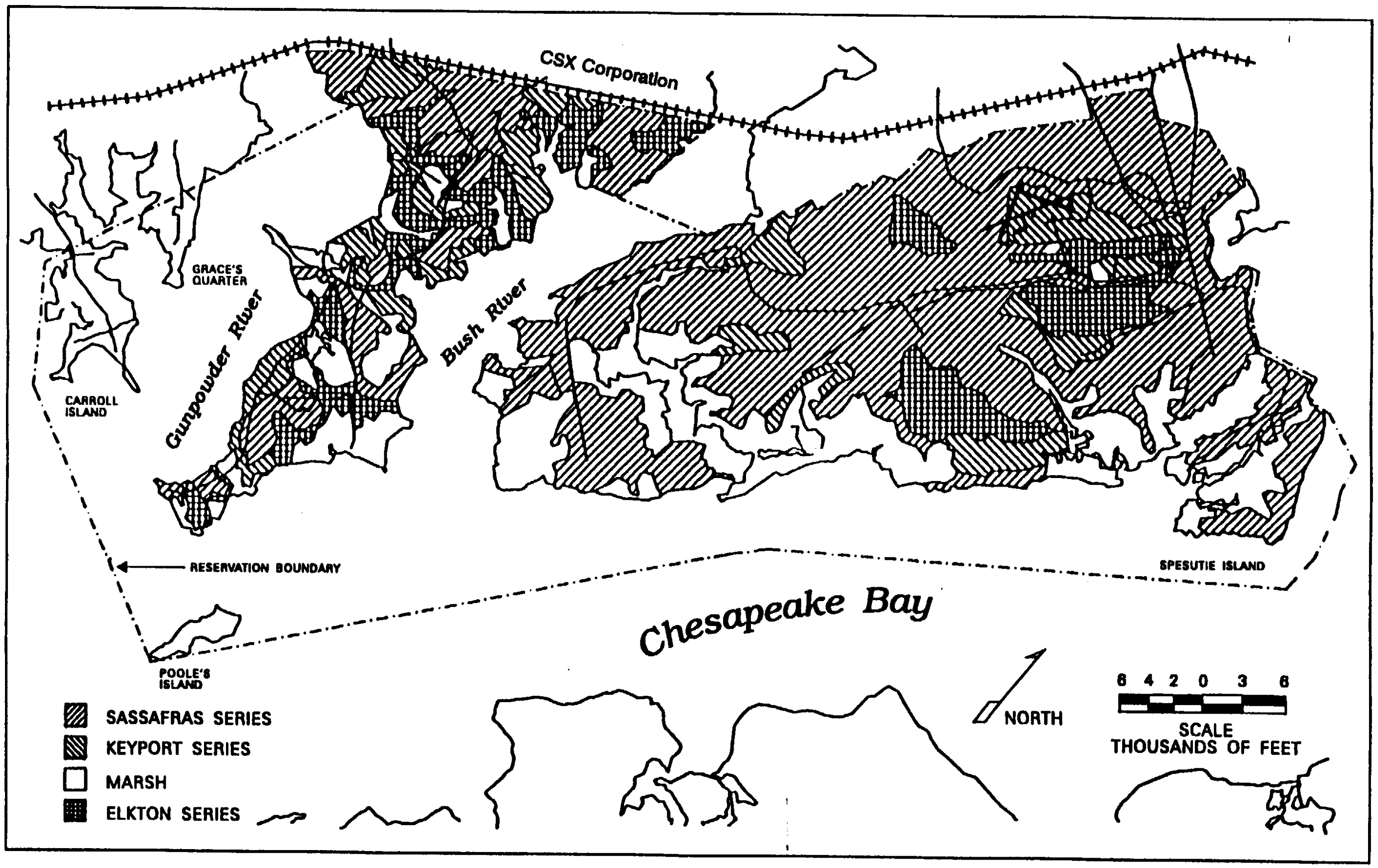

Figure 4-6 Distribution of Soil Series on Aberdeen Proving Ground, Maryland

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4.1.4 Water

The Edgewood Area is a peninsula bounded by the Gunpowder River and Bush River. The surface area of the Edgewood Area is drained by seven major creeks. Canal Creek (approximate surface area 3,000 acres) is the largest drainage system in the Edgewood Area (Figure 4-7). The remaining creeks include Lauderick Creek and Kings Creek (which flow into the Bush River), and Reardon Inlet and Wright Creek (which flow into the Gunpowder River). All surface drainage from APG either empties into the Chesapeake Bay directly or through tributaries (Gunpowder River and Bush River). Due to the connections to the bay and the lack of a strong gradient in elevation, the water flow in the creeks and rivers of APG is sluggish. Water flow is strongly influenced by tidal action. The Atlantic Coastal Plain lacks significant elevation (see Section 4.1.3). The flat topography at APG results in a large portion of the land surface of APG lying within the 100-year flood plain (Figure 4-8) (U.S. Army Corps of Engineers, 1983). The flood plain was defined by the U.S. Army Corps of Engineers (1983) study as land with elevation less than eight feet (plus or minus 0.5 feet). Land with elevations greater than this value would be above the area subjected to flooding. Building E3081 is constructed on the lowest elevation of all buildings in the (USAMRICD facilities complex and lies approximately 10 feet above mean sea level.

Since 1919, the surface waters of APG have been utilized for test firing of projectiles. A portion of the Bush River is shared by several firing ranges. The river bottoms surrounding APG have numerous inert and unexploded shells.

Kings Creek, which empties into the Bush River, is the nearest water body to the (USAMRICD facilities complex. During WWII and until the mid-1970s, chemical sewers and stormwater sewers from the hospital and research chemical laboratories complex located in the area currently occupied by (USAMRICD (see Section 4.1.1) discharged to ditches and the marsh associated with Kings Creek. By the mid-1970s all discharges other than stormwater sewers to Kings Creek had been eliminated. The sediments of Kings Creek contain elevated concentrations of metals. The precise source of these metals is unknown but is believed to be other research laboratories to the south and southeast of the (USAMRICD facilities complex (U.S. Army Environmental Hygiene Agency, 1989).

The Chesapeake Bay is nearly 4,400 square miles in surface area and is the largest estuary in the country. The watershed of Chesapeake Bay extends 64,000 square miles and includes portions of the District of Columbia, New York, Pennsylvania, Maryland, Delaware, Virginia and West Virginia The watershed is occupied by 13.6 million people The average population density in the watershed is greater than 200 people per square mile. The Chesapeake Bay has water quality problems associated with excessive inputs of organic matter, nutrients, and toxic substances (particularly during the 1970's). These water quality problems are associated with high population density and size of the watershed. Approximately two thirds of the bay is less than 18 feet deep. Tidal fluctuation generally ranges between one and two feet. Tidal currents in the Chesapeake Bay have a net flow towards the ocean. Denser, saline water flows on the bottom of the bay, and less dense, lower salinity water from the freshwater tributaries moves through the bay to the sea

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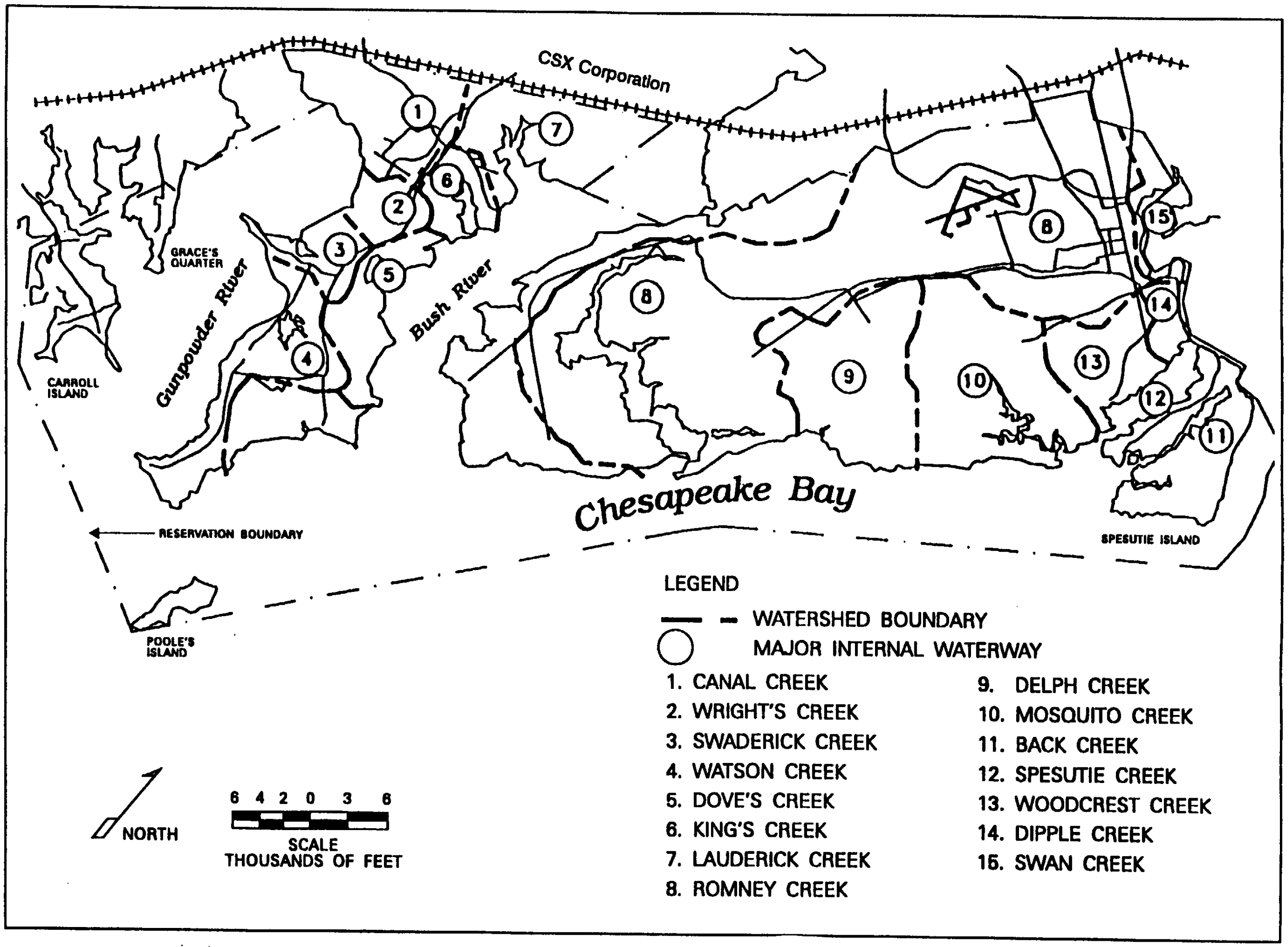

Figure 4-7 Major Drainage Areas on Aberdeen Proving Ground, Maryland

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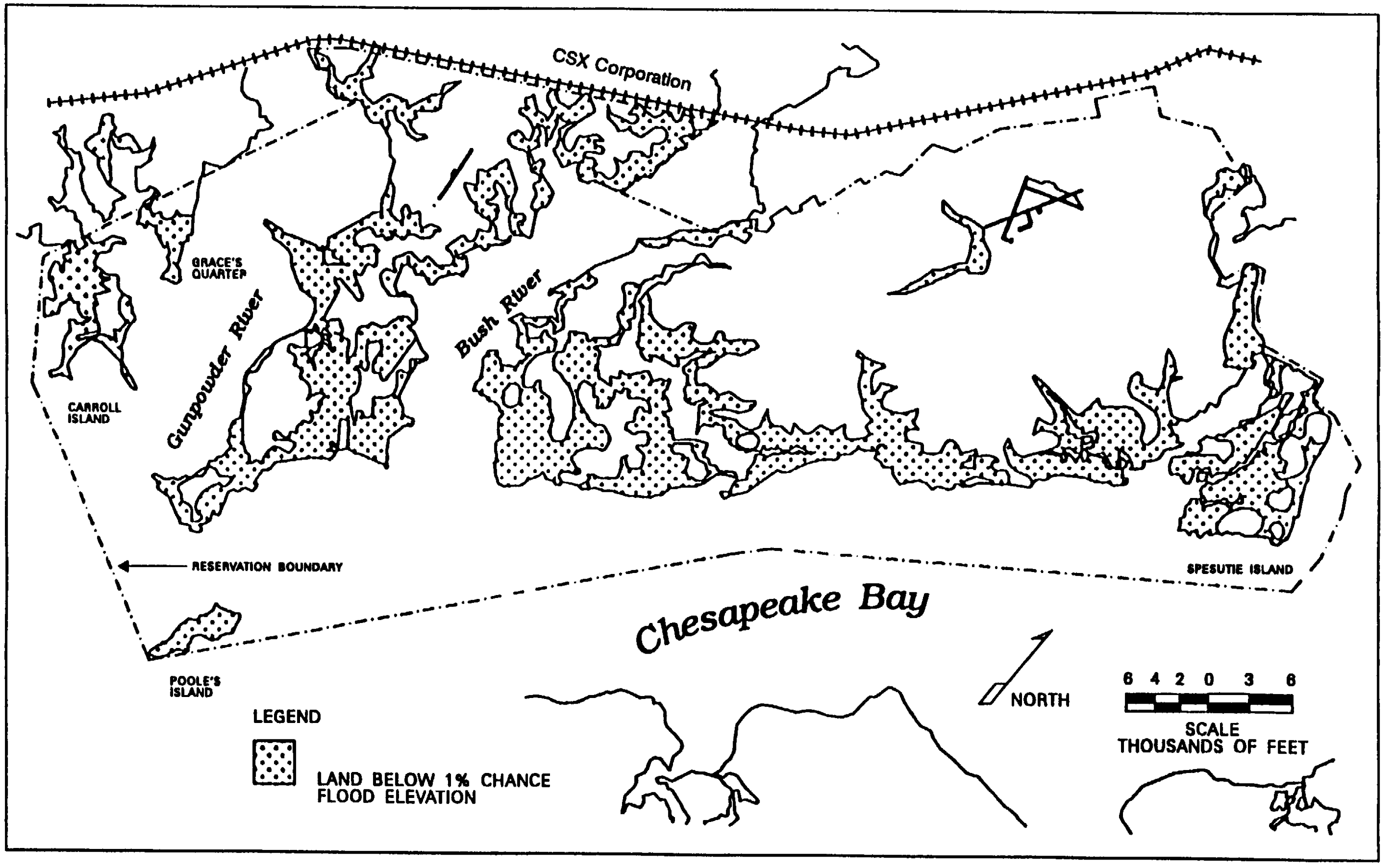

Figure 4-8 Approximate Boundaries of Land Below 100-year Flood Plain Elevation

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Groundwater from the higher-elevated Piedmont plateau towards the coastal regions. Consequently, groundwater in the immediate vicinity of the Edgewood Area tends to flow in a southeasterly direction. The water table in the Edgewood Area is shallow and frequently is 05 to 1 meter below the soil surface. The water table may be as deep as 10 meters. Numerous shallow ponds are present where the water table is near the soil surface. The water table gradient is usually towards the low areas. Subsurface flow rates usually range between 0.2 and 2 meters per year but may be much greater in sandy areas. Subsurface water flow may be variable due to the presence of sand and clay pockets. Essentially all groundwater in the area originates from either precipitation or recharge from surface water bodies. More than 100 groundwater wells hew been drilled on APG since 1917. These wells are generally 9 to 116 meters deep with well yields between 5 to 500 gallons per minute. The shallow aquifer underlying the (USAMRICD facilities complex does not yield large quantities of water (U.S. Army Environmental Hygiene Agency, 1989).

The quality of groundwater in the region near APG depends upon the depth of the well. Groundwater quality is determined by both geological characteristics of the rock formations of the particular well and man-made contamination. Deep welds near APG usually produce high quality water with lime contamination. Shallower wells are more strongly influenced by man-made contamination such as hydrocarbons and naturally contain higher concentrations of iron, manganese and sulfides (U.S. Army Toxic and Hazard Materials Agency, 1983). Wells located in areas formerly used for the production and disposal of chemical compounds frequently have concentrations of inorganic and organic substances greater than the concentration recommended by the USEPA Safe Drinking Water Standards (PL 93-523 as amended).

The water source for the Edgewood Area is surface water from Winters Run. The Van Bibber water treatment plant serves the Edgewood Area. Surface water is pumped from Winters Run, treated and delivered to the various buildings in the Edgewood Area via a cast iron distribution system. Deep groundwater wells are available as an auxiliary water supply. The Van Bibber water treatment plant can pump up to four million gallons per day. Surface waters are treated with lime and alum to reduce turbidity, disinfected by chlorination, and injected with sodium silicate to reduce corrosion in the distribution system.

Wastewater from the Edgewood Area including (USAMRICD is treated in the Edgewood Main wastewater treatment plant. This facility was constructed in the 1940's and treats an average of 0.9 million gallons per day prior to discharging the effluent into the Bush River. The plant is permitted to discharge between 2.6 and 2.8 million gallons per day (Kanowitz, 1992). The Edgewood Main wastewater treatment plant is permitted by the State of Maryland (Maryland Permit Number 90-DP2531). The wastewater treatment plant also is federally permitted through the National Pollutant Discharge Elimination System (NPDES) (Permit Number MD 0021229). These permits have been recently renewed and will expire on January 31, 1997. The Bush River is designated by the State of Maryland as *a Use* lI waterbody (COMAR 26.08.02). This water classification requires that surface water maintain sufficient quality to support shellfishing activities. The critical water quality criteria influencing *Use 11* classification are fecal coliform bacteria, dissolved oxygen content, pH, and turbidity levels.

4.1.5 Air Quality

The Edgewood Area is located in the U.S. Environmental Protection Agency (USEPA) Air Quality Region III. This region includes metropolitan Baltimore and exceeds the USEPA National Ambient Air Quality Standards (NAAQS) for ozone and has been designated as a non-attainment area for this air pollutant. Monitoring data collected by the State of Maryland for the period 1987 to 1989 indicates that this region averages 0.194 parts per million (ppm) of ozone compared to a 0.1 ppm NAAQS limit (Advanced Sciences Inc., 1990). The major source of ozone (triatomic oxygen) is believed to be vehicular traffic. High concentrations of hydrocarbons and nitrogen oxides participate in photochemical reactions to produce ozone (Perkins, 1974). The heavy industry and vehicular traffic in the Baltimore region are the major contributors of these compounds to the atmosphere.

The State of Maryland incorporates USEPA regulations for air quality standards implemented pursuant to the 1977 Clean Air Act. Citations include 40 CFR Parts 50, 51, 52, 57, 60, 61, 80, and 82. Subjects covered include ambient standards, new stationary sources, hazardous pollutants, and related topics. APGSA implements the 1977 Clean Air Act Amendments through AR 200-1. The MDE implemented regulations governing acceptable ambient levels for approximately 600 Toxic Air Pollutants (TAPs) in 1990 (COMAR 26.11.13). A TAP is a substance which causes or is suspected to cause adverse human health effects but is not a pollutant included in the NAAQS. The MDE has developed methods for determining screening levels for these TAPs which describe the maximum threshold levels to which the surrounding population may be exposed without unreasonable acute or chronic health risks. COMAR 26.11.15 requires sources of TAPs to comply with standards including those otherwise exempted by COMAR 10.18.02.02.03.

APG is the site of various other DA activities which also generate air emissions Non-USAMRICD activities emit petroleum products (fuels, solvents, greases, cleaning, and cutting fluids), assorted volatile organic compounds (VOCs), combustion products (carbon monoxide, carbon dioxide, sulfur dioxide, nitrogen oxides, particulate matter, lead), ordnance, munitions, smoke, and simulants. VOCs are hydrocarbons which react with nitrogen oxides and oxygen to form ozone (Perkins, 1974). The largest source of VOCs on APG is motor vehicle emissions (Advanced Sciences Inc., 1990).

In response to the new State of Maryland regulations governing TAPs (COMAR 26.11.13), APGSA conducted an inventory of all outakes including those of (USAMRICD (General Physics Corporation, 1991a; 1991b). The methodology employed in these studies consisted of applying generalized emission rates for certain activities and substances to estimate the amount of TAPs emitted. Activities and sources within each building were determined based on the annual level of activity and materials used at each particular location. These estimates, therefore, are approximate and are not based on actual sampling data.

USAMRICD contributes air emissions in the form of laboratory wastes vented to the atmosphere through chemical fume hoods and emissions from the operation of the medical waste incinerator. In this EA, provided in General Physics Corporation (1991a, (1991a< were used to calculate the volume of air emissions arising from laboratory operations. These laboratory emissions are estimated before being filtered through the fume hoods. HEPA and HEGA filters remove more than 99.9 per cent of particulate matter and organic vapors prior to discharging to the atmosphere (see Section 23.2.1). Therefore, due to the efficiency of the HEPA and HEGA filters, actual emissions are much lower than the estimated values (Table 4 -1). Laboratory operations at (USAMRICD contribute 41 chemicals to the atmosphere of the Edgewood Area (Table 4-1). Atmospheric loading rates **for the majority** of the substances attributable to (USAMRICD laboratory activities are extremely small. Approximately 84 percent of (USAMRICD laboratory air emissions are formaldehyde. Estimated emissions from the medical waste incinerator are provided in Table 4 -2 (General Physics Corporation, 1991b). These values are conservative estimates since they are based on 160 burns a year (1991 burns totaled 325). The major emissions arising from the medical waste incinerator are hydrogen chloride, particulate matter (PM 10), and nitrogen oxides (NO_x) The medical waste incinerator annually emits nearly 12 tons of hydrogen chloride and one ton of particulate matter to the atmosphere of the Edgewood Area based on 160 burns per year. Hydrogen chloride is formed when chlorinated plastics (e.g. polyvinyl chloride) are burned. Particulate matter is a product of incomplete combustion while nitrogen oxides are produced by burning at high temperatures (Perkins, 1974). The estimated concentrations of chemicals in Table 4 -1 and Table 4-2 emitted by (USAMRICD laboratory operations do not exceed the amount allowed by TAP regulations of the State of Maryland (see General Physics Corporation, 1991a; 1991b). The only TAP exceeded by emissions from the Edgewood Area is phosphoric acid (Lafontaine, 1992). There is no source of phosphoric acid from either the (USAMRICD incinerator or from (USAMRICD laboratory operations. The actual emissions from (USAMRICD are lower than the estimated values shown in Table 4 -3 due to filtration provided by HEPA and HEGA filters.

The contribution of all of the operations of (USAMRICD to total Edgewood Area emissions are provided in Table 4-3. Laboratory operations and the medical waste incinerator emit at least 50 substances into the atmosphere of the Edgewood Area based on the modeling of General Physics Corporation (1991a, 1991b). (USAMRICD laboratory operations are responsible for essentially 100 percent of the area emissions for 35 substances. The majority of these 35 chemicals are emitted in very small quantities. The high percentage contribution of (USAMRICD to the total emissions of these materials is due to the exclusive use of these substances by (USAMRICD The emission rates for these chemicals are not above the threshold limits mandated by COMAR 26.11.13 in any instance.

The proposed new incinerator (see Section 2.3.2.4) will be equipped with an automatic feed and ash removal system at the request of the State of Maryland (USAMRICD 1990). Automatic ash removal will reduce the volume of particulate matter (PM 10) discharged into the atmosphere. The planned incinerator will consist of a two chamber system burning at 1400 degrees Fahrenheit (primary combustion chamber) and

Table 4-1 **Air Emission Inventory for USAMRICD Laboratory Operations (Data taken from General Physics Corporation, 1991a. Emissions are estimated prior to HEPA and HEGA filtration)**

Chemical	Emissions (pounds/year)				
	Building E3081	Building E3100	Building E3244	Total USAMRICD	All Edgewood Area
Acetone	3.076	10.010	0	13.085	111.785
Acetonitrile	5.29 E-06[a]	2.11	0	2.11	300.19
Acrolein	0	2.11 E-07	0	2.11 E-07	2.11 E-07
Ammonia	0.0551	0	0	0.0551	0.0551
Aniline	0	0.000254	0	0.000254	0.000254
Benzene	0	0.502	0	0.502	8.979
Benzoyl Peroxide	0	2.2 E-05	0	2.2 E-05	2.2 E-05
Bromine	0	0.0111	0	0.0111	0.0111
n-Butyl Alcohol	0	0.0145	0	0.0145	0.0145
sec-Butyl Alcohol	0	0.00545	0	0.00545	0.00545
t-Butyl Alcohol	0	2.24 E-06	0	2.24 E-06	2.24 E-06
Chlorine	0	0.11	0	0.11	0.11
Chloroform	0.066	1.98	0	2.046	135.846
Copper Sulfate	0	7.33 E-09	0	7.33 E-09	1.0 E-08
p-Cresol	0	1.19 E-10	0	1.19 E-10	NI[b]
Cycloheximide	0	6.61 E-11	0	6.61 E-11	32.4
Ethylene Oxide	0	6.0 E-08	0	6.0 E-08	6.00 E-08
Formaldehyde	138.98	7.27 E-06	0	138.98	179.78
GB	3.28 E-09	7.71 E-09	0	1.0 E-08	1.0 E-08
Hydrogen Chloride	0	0.049	0	0.049	23,834.37
Hydrogen Peroxide	0.000271	1.34 E-10	0	0.000271	0.000271
Hydroquinone	7.93 E-08	2.63 E-15	0	8.0 E-08	8.0 E-08
Isopropyl Alcohol	5.18 E-08	0.415	0	0.415	0.415
Lewisite	3.02 E-10	0	0	3.02 E-10	NI
Mercuric Chloride	0.0529	0	0	0.0529	0.0529

Chemical	Emissions (pounds/year)				
	Building E3081	Building E3100	Building E3244	Total USAMRICD	All Edgewood Area
Methanol	2.12 E-05	5.28	0	5.28	128.53
Methyl Ethyl Ketone	0	7.49 E-06	0	7.49 E-06	67.2
Mustard	1.74 E-09	2.32 E-11	0	1.76 E-09	NI
Nitric Acid	0.0136	0	0	0.0136	251.013
p-Nitrophenol	0	5.29 E-05	0	5.29 E-05	5.29 E-05
Phenol	0.000124	5.01 E-08	0	0.000124	0.000124
Phosgene	0.00011	6.61 E-05	5.5 E-06	0.000182	0.000182
Physostigmine	0	3.0 E-08	0	3.0 E-08	3.00 E-08
Picric Acid	0.000551	0	0	0.000551	0.000551
Semicarbizide	0	1.32 E-09	0	1.32 E-09	NI
Sodium Cyanide	0	1.8 E-07	0	1.8 E-07	1.8 E-07
Sodium Hydroxide	0	0.0044	0	0.0044	0.0044
Sulfuric Acid	0.0278	0.00074	0	0.029	21.528
Toluene	0.0185	0.93	0	0.94	58.77
VX	0	5.55 E-13	0	5.55 E-13	NI
Xylene	1.72	0.11	0	1.83	45.83
TOTAL	144.02	21.07	5.5 E-06	165.09	-

(a) Very small numbers are presented with the use of negative exponents. To determine the value of a number presented in this form use division. For example: E-05 = 10^{-5} = $1/10^5$ = 1/100,000 = 0.00001.
(b) NI = Not included in General Physics Corporation Edgewood Area totals.

Table 4-2 Estimated Emissions for the USAMRICD Incinerator (Data taken from General Physics Corporation, 1991b)

CHEMICAL	EMISSION RATE (pounds/year)
Arsenic	0.0513
Cadmium	1.64
Chromium	0.146
Dioxins and Furans	0.000518
Nickel	0.12
Manganese	0.0274
Hydrochloric Acid	23,400
PM_{10}	1,920
NO_x	716
Iron	4.39

Table 4-3 Air Emission Contribution from USAMRICD Laboratory and Incinerator Operations to Total Edgewood Area Air Emissions (Laboratory emissions are estimated prior to HEPA and HEGA filtration.)

Chemical	Incinerator	Laboratory Activities USAMRICD	All Edgewood Area	USAMRICD Percent Contribution
	Emissions (pounds/year)			
Acetone	0	13.085	111.785	11.7
Acetonitrile	0	2.11	300.19	0.7
Acrolein	0	2.11 E-07[a]	2.11 E-07	100
Ammonia	0	0.0551	0.0551	100
Aniline	0	0.000254	0.000254	100
Arsenic	0.0513	0	0.0513	100
Benzene	0	0.502	8.979	0.6
Benzoyl Peroxide	0	2.2 E-05	2.2 E-05	100
Bromine	0	0.0111	0.0111	100
n-Butyl Alcohol	0	0.0145	0.0145	100
sec-Butyl Alcohol	0	0.00545	0.00545	100
t-Butyl Alcohol	0	2.24 E-06	2.24 E-06	100
Cadmium	1.64	0	1.64	100
Chlorine	0	0.11	0.11	100
Chloroform	0	2.046	135.846	1.5
Chromium	0.146	0	0.146	100
Copper Sulfate	0	7.33 E-09	1.0 E-08	73.3
p-Cresol	0	1.19 E-10	NI[b]	100
Cycloheximide	0	6.61 E-11	32.4	0.0002
Dioxins and Furans	0.000518	0	0.000518	100
Ethylene Oxide	0	6.0 E-08	6.0 E-08	100
Formaldehyde	0	138.98	179.78	77.3
GB	0	1.0 E-08	1.0 E-08	100
Hydrogen Chloride	23,400	0.049	23,834.37	99.9
Hydrogen Peroxide	0	0.000271	0.000271	100

Chemical	Incinerator	Laboratory Activities USAMRICD	All Edgewood Area	USAMRICD Percent Contribution
	Emissions (pounds/year)			
Hydroquinone	0	8.0 E-08	8.0 E-08	100
Iron	4.39	0	4.39	100
Isopropyl Alcohol	0	0.415	0.415	100
Lewisite	0	3.02 E-10	NI	100
Manganese	0.0274	0	NI	100
Mercuric Chloride	0	0.0529	0.0529	100
Methanol	0	5.28	128.53	4.1
Methyl Ethyl Ketone	0	7.49 E-06	67.2	0.00001
Mustard	0	1.76 E-09	NI	100
Nickel	0.12	0	0.12	100
Nitric Acid	0	0.0136	251.013	0.005
p-Nitrophenol	0	5.29 E-05	5.29 E-05	100
NO_x	716	0	264,462	0.3
Phenol	0	0.000124	0.000124	100
Phosgene	0	0.000182	0.000182	100
Physostigmine	0	3.0 E-08	3.0 E-08	100
Picric Acid	0	0.000551	0.000551	100
PM_{10}	1,920	0	234,448	8.2
Semicarbizide	0	1.32 E-09	NI	100
Sodium Cyanide	0	1.8 E-07	1.8 E-07	100
Sodium Hydroxide	0	0.0044	0.0044	100
Sulfuric Acid	0	0.029	21.528	0.1
Toluene	0	0.94	58.77	1.6
VX	0	5.55 E-13	NI	100
Xylene	0	1.83	45.83	4.0

(a) Very small numbers are presented with the use of negative exponents. To determine the value of a number presented in this form use division. For example: E-05 = $10^{-5} = 1/10^5$ = 1/100,000 = 0.00001.
(b) NI = Not included in General Physics Corporation Edgewood Area totals.

1800 degrees Fahrenheit (secondary combustion chamber). Particulate retention in the second chamber is designed to be two seconds. The higher temperature of the primary combustion chamber and additional contact time will increase burning efficiency and reduce the amount of particulates emitted (Perkins, 1974). The new incinerator will also use an Air Toxics Best Available Control Technology (T -BACT) air pollution control system. This system will include a scrubber which will reduce the hydrogen chloride emissions by at least 90 percent in addition to further reducing particulate matter.

4.1.6 Agriculture

More than 55 percent of the 247,000 acres of Harford County (excluding APG) are utilized for agricultural purposes. Field corn, hay, milk, and soybeans are the primary agricultural products. Commercial woodlands consisting of oak, hickory, and yellow pine are also found in Harford County. Approximately 716 acres of Harford County are approved for surface mining operations and produce sand, crushed stone, gravel, and clay.

4.1.7 Cultural Resources

4.1.7.1 Historical

The Maryland Inventory of Historic Properties does not contain any documented resources located within or adjacent to (USAMRICD There are, however, numerous archaeological sites within the Edgewood Area (Buildings E3061 -E3080) (Cole, 1991). These sites are principally of early colonial and Native American origin. Harford County contains more than 150 structures which are listed in the National Register of Historic Places. Two listed historic places are in the Edgewood Area. The Presbury Church at Gunpowder Neck was constructed in 1772 and may be the oldest standing Methodist church in the U.S. The Presbury family home (also known as Quite Lodge) was built in 1740 and has been used as officers quarters (see Section 4.1.7.2).

4.1.7.2 Archaeological

APG has been occupied by humans since approximately 11,500 B.C. An extensive description of the Native American historical components of APG is provided in Klein (1988). Forty -four of the 60 known prehistoric cultural resource sites, including a fossil site which is rare in the eastern seaboard, are listed in the files of the Division of Archaeology, Maryland Geological Survey. At APG, 477 historic sites are dated prior to 1940 (Klein, 1988).

An archaeological overview was performed in 1988 for APG; however, a phase one dig has not been performed at (USAMRICD According to the Maryland Historical Trust, no documented archaeological sites are within the boundaries of (USAMRICD However, undisturbed portions of the area have a high potential of archaeological deposits because of the presence of mid-nineteenth century buildings in the area depicted on historic maps. Historical archaeological deposits frequently are associated with cartographically represented structures (Cole, 1991). No sites of archaeological importance have been uncovered at (USAMRICD in the course of past construction and maintenance activities (see Section 4.1.7.1).

4.1.8 Climate

The Edgewood Area is strongly influenced by both continental and off -shore maritime air masses. The close proximity to the Atlantic Ocean and Chesapeake Bay moderate temperature extremes in the summer and winter compared to areas more inland. Atmospheric currents flow in a general west to east pattern. The prevailing winds are from the west and northwest. The average wind speed is nearly 10 mph.

The warmest period of the year is generally the last half of July and the coldest period is usually mid-January to mid-February (Table 4-4). Freezes occur an average of 20 days per year during the period from late October to mid-April. The Appalachian Mountains moderate the severity of continental cold fronts. During the summer and fall, high pressure systems centered over the Atlantic Ocean cause humidity to be high and contribute to frequent afternoon thundershowers. Approximately 30 thunderstorms per year occur along the Chesapeake Bay. Annual mean rainfall is 38.58 inches. March (3.8 inches) and August (3.79 inches) are generally the rainiest months, while the driest month is usually February (230 inches). The Edgewood Area averages 22 inches of snowfall per year.

Hurricanes and tornadoes in this area of the country are relatively rare. Hurricanes in Maryland occur an average of once every ten years, while the probability of a tornado in the area of APG is 0.0005 tornadoes per year (Thom, 1963).

4.1.9 Energy Resources

Depletable resources consumed by (USAMRICD include natural gas and fuel oil. Electrical service to APG is provided by the Baltimore Gas and Electric Company from its Edgewood substation.

4.1.10 Sociological

Harford County had a reported 1990 population of 182,132 and a 1980 population of 145,930. Proportions of the population by race in 1990 were approximately 893 percent White, 85 percent Black and 2.2 percent Other. The estimated 1990 population represented an increase of approximately 25 percent since 1980. The projected county population by the year 2000 is 228,000 (Rooney, 1991). The number of households reported in 1990 was 63,193. The average number of people per household in Harford County was 2.83 in 1990 (Harford County Department of Planning and Zoning, 1990). In 1980, 46,547 housing units were in Harford County. In 1990, the housing units available had increased to 65,562 and were projected to be 85,174 by the year 2000 (Harford County Department of Planning, 1990).

Table 4-4 Average Temperature and Precipitation at Bel Air, Maryland (Data taken from Soil Conservation Service, 1975)

Month	Average Maximum (degrees Fahrenheit)	Average Minimum (degrees Fahrenheit)	Precipitation (inches)
January	41.4	22.2	3.10
February	44.4	23.9	3.21
March	52.4	29.8	3.98
April	64.9	39.9	3.87
May	74.5	49.7	3.86
June	82.5	58.9	3.70
July	86.1	63.5	4.33
August	84.3	62.0	5.11
September	78.2	55.2	3.96
October	68.3	44.4	2.81
November	55.6	34.3	3.89
December	43.9	25.1	4.01

The two major population areas near the Edgewood Area are Bel Air (30,800) at the intersection of U.S. Route 1 and State Route 22 and the Edgewood-Joppatowne complex (28,000) located near the entrance to the Edgewood Area The industrial corridor in southern Harford County consisting of Interstate 95, U.S. 40, and the Conrail and the CSX Corporation railroads has been the center of recent growth.

4.1.11 Noise

The noise environment at APG is strongly influenced by aircraft and impulse noise associated with the detonation of ordnance. Sustained noises due to traffic and aircraft are common at APG. A small number of complaints have been addressed to APG regarding noise related to aircraft and ordnance detonation. At (USAMRICD noise is considered primarily from an industrial health perspective. Industrial hygienists form Kirk Army Health Center periodically survey work areas of (USAMRICD for hearing hazards, and quantitative studies of the ambient noise environment within the (USAMRICD buildings are periodically conducted. These studies have determined that cage washers and individuals using sonicators and polytrons in laboratories must wear protective ear plugs to avoid noise hazards (Bouisseau, 1992). The MDE and the community of Edgewood have no records of complaints of excessive noise against USAMRICD.

4.1.12 Odors

Activities at (USAMRICD require that considerable waste material be rendered nontoxic or sterile through incineration. This material includes contaminated laboratory materials, animal remains, and animal bedding. While incineration provides effective treatment and disposal of infectious waste, associated odors may be transiently offensive. These odors are localized in area and time and are rapidly dispersed in the ambient atmosphere. There are no records of complaints of offensive odors from the USAMRICD.

4.1.13 Economic Environment

4.1.13.1 Employment

More than 3,000 businesses operate in Harford County. The total number of employed persons in Harford County during 1991 was approximately 72,000. APG employed more than 8,600 civilians during 1989 and is the major government employer. The total civilian and military employment at APG was nearly 15,000 in 1989. Approximately 70 percent of the APG work force resides in Harford County. As of July 27, 1992, the staff of (USAMRICD included 63 military personnel and 215 civilian personnel. The total personnel strength of 263 at (USAMRICD represents approximately 2 percent of the total work force at APG. Unemployment in Harford County generally ranges between 45 percent and 8.5 percent (Rooney, 1992).

4.1.13.2 Income

Median household income in Harford County in 1980 was $ 21,913. The estimated median household income in 1990 was $ 42,737 (Rooney,1992). The Effective Buying Income (EBI), also known as disposable personal income, for the average household in Harford County was $ 38,356 in 1987. The EBI was $ 32,650 for the median household in Harford County. Nearly 70 percent of the payroll of APG is paid to residents of Harford County. It is estimated that the total financial impact of APG on Harford County, including salaries and contracts with businesses, was more than $300 million in Fiscal Year (FY) 1988 (Advanced Sciences Inc., 1990).

4.1.13.3 Properly Values

The median price of a new home in Harford County was $ 141,525 as of January 1992 (Legg Mason Realty, 1992).

4.1.14 Public Opinion

Potential issues of public concern at the local level relate to the daily operation of (USAMRICD These issues include generation of offensive odors, waste stream management, and waste stream disposal. Harford County and the Town of Bel Air have no records of negative local public opinion regarding these issues.

4.1.15 Transportation

4.1.15. 1 Road

Ample access is available to APG and (USAMRICD through the local road network. U.S. Route 40 and Interstate 95 are located west of APG. Interstate 95 intersects with Routes 22, 24 and 152 which in turn connect to entrances to APG. There are more than 3,000,000 square meters of paved and unpaved roads within APG. The major routes on APG are designed to handle 9,000 vehicles (eight percent to ten percent trucks) per day. The traffic on State Road 24 just north of the APG gate was measured at 17,925 vehicles for one day in 1990 (Sheridan, 1992). This road is the nearest major route to APG near the (USAMRICD facilities complex. (USAMRICD is the destination of approximately 250 cars per day. The traffic to (USAMRICD represents approximately 3 percent of the daily traffic on State Route 24. Greyhound bus service is available from the Town of Aberdeen.

4.1.15.2 Rail

Passenger rail service to the Town of Aberdeen is available via AMTRAK an average of four times a day. The CSX Corporation and Conrail railroad systems also serve the Harford County area Approximately 30 miles of rail tracks are in service within APG. The Conrail main line at Aberdeen interchanges with the APG rail system. All rail activities within APG are performed by APG personnel after transfer from commercial rail systems.

4.1.15.3 Air

Commercial airline service is available to the Edgewood Area through the airports located in the Washington and Baltimore metropolitan areas. Air service is available by Baltimore -Washington International Airport (BWI), Dulles International Airport, and Washington National Airport (DCA) Edgewood is approximately 30 miles from BWI, 40 miles from DCA, and 60 miles from LAD.

There are two Army airfields at APG - The Weide Army Air Field in the Edgewood Area and Phillips Army Air Field. The USAMRICD facilities complex is immediately to the east of Weide Army Air Field. No commercial air service is available to the installation and airspace over the installation is restricted.

4.1.15.4 Traffic

The transportation needs of USAMRICD are served adequately by the existing highway system. There are no reports of unusual traffic congestion associated with State Road 24 and the gate at APG or near the USAMRICD facilities complex (Sheridan, 1992) (see Section 4.1.15.1).

4.1.16 Communication

Communication outside of USAMRICD is accomplished by commercial telephone or fax machine. Internal communication systems include a public address/paging system, intercom, and two -way radio.

5.0 ENVIRONMENTAL AND SOCIOECONOMIC CONSEQUENCES

5.1 Introduction

An evaluation of the current and potential environmental consequences of operations at USAMRICD is presented in this section. The proposed action and alternatives considered are analyzed relative to the conduct of currently planned and routine activities. As detailed below, this analysis concludes that no significant adverse environmental effects are associated with continuation of present activities at USAMRICD. Moreover, positive benefits to the economy of Harford County and to the defense posture of the U.S. are identified. These conclusions are based upon an evaluation of current routine operations at USAMRICD and any associated environmental impacts, potential adverse impacts resulting from cumulative effects, and an analysis of the potential harm to the environment resulting from the accidental release of hazardous materials. The proposed action is evaluated after comparisons with the suggested alternatives. It is concluded that continuation of research and testing activities at USAMRICD has more positive attributes than the proposed alternatives.

The MCDRP and medical BDRP missions of USAMRICD involve similar aspects of the defense research program. Although the MCDRP work involves chemical agents and the medical BDRP work at USAMRICD is concerned with toxins, likely exposure routes to humans are similar in the event of a worst credible event (see Section 5.25.1 and Section 5.2.5.2). The environmental pathway by which humans and wildlife would most likely be exposed to chemical agents (Department of the Army, 1988) and toxins (BDRP FPEIS, 1989) is through aerosol release. As detailed throughout Section 5.0, a significant aerosol release is viewed to be highly improbable. However, the similar environmental pathways and safety/containment procedures applicable to both MCDRP and BDRP work provide a common foundation for determining the environmental consequences of routine activities at USAMRICD.

In the context of this EA, the major difference between the two classes of agents is the mode of production. Chemical agents are synthesized in the laboratory whereas toxins are metabolic products of particular organisms. Toxins are not alive but are biological molecules which are subject to degradation, denaturation, or decay and, unlike living organisms, do not reproduce (see Section 5.2.5.1). Exposure to heat, acids, bases, enzymes, or dilution can render toxins harmless (see Appendix 4, BDRP FPEIS).

The BDRP FPEIS developed program-specific Risk/Issue category assignments to evaluate the environmental effects of BDRP activities. The USAMRICD was identified as conducting work in Risk/Issue category III (Toxins) (see Appendix 3, BDRP FPEIS). The potential environmental effects associated with the BDRP Risk/Issue category of Toxins were programmatically evaluated in the BDRP FPEIS. Risk/Issue category III includes all toxins.

All of the toxins in use within the BDRP (including the USAMRICD) are of biological origin (derived from natural sources) (see Appendix 4, BDRP FPEIS). Appendix H details the programmatic evaluation for all toxins used in the BDRP, however the toxins periodically in use at USAMRICD only include botulinum, palytoxin, ricin, saxitoxin, staphylococcal enterotoxin B. and tetrodotoxin. These toxins require only BSL -2 safety/containment and practices (see Section 2.4.3) (Valdivia, 1992a).

The potential adverse environmental effects related to research activities involving the use of chemical agents conducted under the MCDRP at USAMRICD are evaluated in detail in this EA. In accordance with NEPA, the evaluation of potential adverse environmental impacts associated with activities involving toxins at USAMRICD presented in this EA relies heavily on the programmatic evaluation of Toxins performed in the BDRP FPEIS (40 CFR 1508.28). Controversial programmatic issues and program administration of the BDRP are not discussed in this EA. Appendices 4 and 6 of the BDRP FPEIS, respectively, contain relevant material describing programmatic Risk/Issue category characteristics and environmental and socioeconomic areas of potential concern.

5.2 Environmental Consequences of Routine Operations

The programmatic analysis of Toxins presented in the BDRP FPEIS was used, in part, to identify and carefully scrutinize areas of potential concern which were examined further to determine the nature of the impacts arising from operations of USAMRICD. Each major component is discussed here regardless of the presence or absence of actual impacts. It is in the context of the baseline environment of USAMRICD, described in Section 4.0 of this EA, that these analyses were made. Section 5.2 identifies the potential impacts of USAMRICD operations on each identified area of potential concern. Each identified area is examined in further detail to determine the magnitude and significance of actual impacts.

5.2.1 Surface Water and Groundwater

There are no significant environmental effects on surface water related to routine operations of USAMRICD. USAMRICD wastewater is discharged to the Edgewood Main wastewater treatment plant where it receives tertiary sewage treatment. The effluent then is discharged into the Bush River. The Edgewood Main wastewater treatment plant processes wastes from the entire Edgewood Area including USAMRICD. The Edgewood Main wastewater treatment plant is a closed plant and does not receive storm water.

Bush River is classified as *Use II* by the State of Maryland (COMAR 26.08.02) and, consequently, the amount of pollution it can receive is strictly limited since the waterbody must maintain sufficient water quality to support shellfishing. In general, the discharge to the Bush River from the Edgewood Main wastewater treatment plant has been in compliance with current NPDES standards with the exception of some operational problems in 1988. At that time, the discharge from the plant exceeded those allowed under the NPDES permit for total suspended solids, fecal coliform bacteria, and Biochemical Oxygen Demand (BOD) for several months. The non-compliance episode was related to uneven water flow to the plant and a change in chemicals used during the treatment process. The problem was corrected, and the Edgewood Main wastewater treatment plant remains in compliance with NPDES standards and those for the State of Maryland (see Section 4.1.4).

In a hypothetical sense, potential adverse impacts to the river would be associated with grossly elevated levels of nitrogen, phosphorus, fecal coliform bacteria, BOD and total suspended solids, and depressed dissolved oxygen concentrations in the effluent. Elevated concentrations of these parameters directly or indirectly cause dissolved oxygen levels in the river to decrease. Significant reduction in dissolved oxygen concentrations would result in death of sensitive e aquatic organisms, which are the most susceptible to organic pollution (Wetzel, 1975). Elevated concentrations of fecal coliform bacteria would make receiving waters unsuitable for shellfishing (COMAR 26.08.02). Fish kills, die -offs of other aquatic organisms, and closure of shellfishing grounds attributable to the Edgewood Main wastewater treatment plant have not been observed in the Bush River (Elmore, 1992). Maintenance of the *Use II* designation attached to the water body by the State of Maryland combined with historical compliance with stringent NPDES permit restrictions indicate the environmental effect of the effluent discharge from the Edgewood Main wastewater treatment plant is minor.

MDE regulates toxic compounds as a part of its wastewater discharge permit program. These permits impose limits on a variety of pollutants including nutrients and toxic substances. They also require regular water quality monitoring by the discharger. Detailed monthly monitoring reports are filed with MDE by APGSA in compliance with COMAR 26.08.02.

As explained, it is highly unlikely that toxins and chemical agents would be released in the effluent of the wastewater treatment plant because no potentially toxic liquid wastes are discharged from USAMRICD prior to being decontaminated (see Section 2.5.2, 2.5.3, 2.5.4, 2.5.5). The Edgewood Main wastewater treatment plant provides primary, secondary, and tertiary treatment to the effluent which would further reduce any harmful concentrations of toxins and chemicals (Gaudy and Gaudy, 1980).

The buildings occupied by USAMRICD are not situated within the 100 year floodplain of Kings Creek (U.S. Army Corps of Engineers, 1978). No significant environmental impacts to Kings Creek from USAMRICD would be anticipated under most flood conditions since potential floodwaters would not come in contact with the USAMRICD facility (see Section 4.1.4).

USAMRICD does not utilize groundwater for routine operations, and wastewater is disposed through the Edgewood Main treatment plant (see Section 4.1.4). Consequently, no negative impacts to groundwater arise from USAMRICD operations.

5.2.2 Land Quality,

USAMRICD activities do not have a serious impact on land use. Activities are being conducted within existing facilities, no construction is proposed, and no existing environments are being adversely affected or altered. USAMRICD land use patterns conform to the current and planned development within Harford County and are consistent with the Installation Master Plan for APG (see Section 4.1.1).

A small negative impact to soil erosion from landfill operations may be expected from the contribution of USAMRICD to the Harford County (Scarboro) Sanitary Landfill. The solid waste contributed to this landfill by USAMRICD consists of an average of 2,500 pounds of incinerator ash per year. The majority of the solid waste generated by USAMRICD (50,000) pounds annually) is incinerated in the Harford Waste -to-Energy Plant or recycled (see Section 2.5.1 Potential soil erosion and the volume of the waste contributed by USAMRICD are negligible.

5 2.3 Air Quality

USAMRICD does not have any significant adverse impacts on air quality because USAMRICD emissions are relatively small (see Section 4.1.5), are well within permitted levels, and appropriate safeguards are in place to prevent significant adverse impacts. All laboratories using CSM must be equipped with multiple, redundant filter systems designed to prevent the release of such substances to the environment. Appropriate safety/containment procedures and practices must be utilized at USAMRICD to prevent release of CSM (see Section 2.4.1 and Section 2.45), other hazardous chemicals (see Section 2.4.2 and Section 2.45), biological toxins (see Section 2.4.3 and Section 2.4.5), and radioactive substances (see Section 2.4.4 and Section 2.45) to the atmosphere. Potential waste products of CSM (see Section 25.2), other chemicals (see Section 25.3), biological toxins (see Section 25.4), radioactive materials (see Section 255), and animal and medical waste (see Section 25.6) must be disposed of in manners consistent with federal and state air quality regulations.

The incinerator at contributes to air emissions through waste stream management activities. The incinerator is rated to handle 375 pounds of waste per hour. On average, the incinerator is operated five times per week Approximately 250 pounds of waste material consisting of used animal bedding, animal carcasses, and any solid waste containing potentially infectious or toxic material are burned each day of operation (1,200 pounds per week). Air emissions from the medical waste incinerator are not an area of significant concern. Incineration activities are in compliance with regulations of the State of Maryland (see Section 25.6 and Section 4.15). Once the planned replacement incinerator is operational, the elevated operating temperature and T -BACT air pollution control equipment will result in even smaller emissions to the atmosphere (see Section 2 5.6).

A minor impact on the ambient air quality arises from the electrical energy required for the operation/maintenance of and vehicle emissions from the automobiles of the commuting work force. Consumption of electrical energy by indirectly contributes to adverse air quality because fossil fuels are used to generate electricity. However, the consumption of electricity by is a negligible component of the total electrical consumption of the Harford County region and APG. Another source of adverse air emissions into the environment is the vehicular emissions from the motorized traffic associated with   is the destination of approximately 250 passenger vehicles daily which are a minor component of the traffic flow in the immediate vicinity of USAMRICD's total traffic flow is approximately two percent of the daily traffic flow in the Edgewood Area (see Section 4.1.15.1). The effects on local and regional air quality are insignificant. Potential adverse effects on human health and the environment are thus negligible.

The MDE requires that ash from medical waste incinerators receive an annual chemical analysis because of its designation as a special handling waste. This testing is required prior to initial acceptance into the landfill and annually thereafter. TCLP analysis of the waste (RCRA classified waste) is required on an annual basis. is in compliance with these requirements (see Section 2.5.6).

Transiently offensive odors may originate from disposal practices at The research and testing activities conducted at require that considerable material, including contaminated laboratory materials, animal remains, and wastewater be rendered sterile and non-toxic through the use of various decontamination techniques and incineration (see Sections 25.1, 25.2, 25.3, 25.4, 25.5, 25.6). These odors are minor and localized and are rapidly dispersed in the atmosphere. Moreover, these odors are a necessary result of procedures used to control, contain, and dispose of toxic material. The temperature in the second combustion chamber of the medical waste incinerator (1,400 degrees Fahrenheit) efficiently destroys most odors (Perkins, 1974) (see Section 2.5.6). There are no reports of citizen complaints describing excessive odors associated with the facilities complex (see Section 4.1.12).

5.2.4 Plant and Animal Ecology

There is minimal potential for adverse impacts to either critical habitats or species of special concern by operation. No state or federally endangered/threatened species are known to inhabit or frequent this area of APG (see Section 4.1.2). Moreover, the general alteration of the natural habitat associated with the large complex of buildings in the Edgewood Area suggests this area is poorly suited for species of special concern.

There are no detectable impacts to wildlife and vegetation by operations at Although federal or state endangered/threatened species or species of special concern do inhabit remote regions of APG, they are not present on grounds and do not use the area immediately adjacent to (see Section 4.1.2).

Consequently, USAMRICD does not exert a negative impact on special status plants and/or animals.

Activities conducted at are consistent with land use patterns and planning policies of Harford County and the Installation Master Plan (see Section 4.1.1) Routine operations do not have a significant impact on the soils and ecological habitat of the area. The facility is not situated on a wetland, although several wetlands are located approximately 500 feet from Buildings E3100 and E3081. During the course of routine operations, no contact is made between personnel and waste materials and the wetlands. facilities do not lie within the 100 year floodplain of Kings Creek (see Sections 4.1.2 and 5.2.1). More extreme flood events would rapidly dilute concentrations of chemicals and toxins below levels which would be deleterious to aquatic and terrestrial life. Protected habitats such as wetlands near and Kings Creek are thus unaffected.

Discharges of gaseous and liquid wastes and disposal of solid wastes originating from must be in compliance with state and federal regulations (see Sections 2.4.1, 2.4.2, 2.43, 2.4.4, 2.45, 25.1, 25.2, 253, 2.5.4, 255, 25.6) and are unlikely to adversely affect native plants and animals (see Section 5.2.1). As the previous discussion at Sections 5.2.1, 5.2.2, and 5.2.3 indicate, hazardous substances (CSM, biological toxins radioactive materials, and chemical carcinogens) must be contained within the laboratory. Additionally, the hazardous waste byproducts of these substances must be either decontaminated prior to release from or disposed of outside in a manner that contains the hazard. Therefore, it is unlikely that hazardous material use at will adversely impact upon native plants and animals. Appropriate water quality standards for the protection of aquatic life are not exceeded by treated sewage discharged from the Edgewood Main wastewater treatment plant (see Section 5.2.1). Maintenance of the *Use II* classification by the State of Maryland for this portion of the Bush River (COMAR 26.08.02) indicates no significant negative environmental impacts are associated with the operation of the Edgewood Main wastewater treatment plant (Elmore, 1992). There are no records of fish kills or harm to other aquatic life in the Bush River attributable to discharges from the Edgewood Main wastewater treatment plant. The potential for any adverse ecological effects associated with the discharge is small.

5.2 5 Human Health and Safety

Section 5.25.1 and Section 5.25.2 examine potential threats to the health and safety of the general public and the work force associated with routine operations at Potential threats to the health and safety of the public and personnel of in the event of a catastrophic occurrence are detailed in Section 5.3, Section 5.3.1, and Section 5.3.2

5.2 5.1 Public Health and Safety

Risk to the health of people outside from routine operations is negligible. Neutralization, filtration, or sterilization of all liquid, air, and solid wastes before discharge to the environment prevents release of chemical agents and biological toxins from (see Sections 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.5, 2.5.1, 2.5.2, 2.5.3, 25.4, 2.5.5, 2.5.6). Although certain citizens feel a degree of risk is associated with waste stream management, there have been no reports or verified claims of significant releases of chemicals or toxins to the outside environment (see BDRP FPEIS).

The estimated atmospheric release of chemical agents from during the conduct of routine activities is extremely small and well below the quantity allowed by the TAP regulations of the State of Maryland. These regulations are designed to prevent adverse human health effects (see Section 4.1.5). As detailed in Section 5.3.1, there is no reason to anticipate impacts to public health and safety even in the event of a worst credible occurrence involving chemical agents.

There is very little possibility that an individual outside the facility could be exposed to toxins. The most potent toxin in use at is botulinum toxin serotype A. An analysis of the history of laboratories working with toxins such as botulinum serotype A concluded that the likelihood of exposure to the general populace as the result of laboratory activities is minimal (see Appendix 8, BDRP FPEIS). The potential for illness originating from laboratory quantities of toxic and biological agents in populations outside facilities such as is small (see Appendices 8 and 9, BDRP FPEIS). No infectious organisms are used at and it is highly unlikely that a person outside could contract a laboratory-associated disease from a worker because human-to-human transmissibility is nonexistent for biological toxins (see Appendix 7, BDRP FPEIS). Building design features must be consistent with the requirements of DA Pamphlet 385-69 for work with tones (32 CFR 627). No person outside of any Army medical research laboratory is known to have been harmed from substances originating from these facilities, including (Valdivia, 1992), in over 40 years of operation (see Appendix 8, BDRP FPEIS). The current activities and historical safety record of are consistent with this conclusion (see Section 5.3.1 and Section 53.2).

As discussed in detail in Section 5.2.6, the major benefit of the operations conducted at is the significant contribution to the U.S. national defense. However, operations at also enhance public health and safety because research and testing efforts at the facility may be used against toxins naturally present in the environment. For example, the bacteria responsible for food poisoning (particularly in canned seafoods and low acid vegetables), *Clostridium botulinum*, are commonly found in soil and produce botulinum serotype A. Consequently, members of the public and military both may potentially benefit from the work conducted at

5.2.5.2 Worker Health and Safety

The actual risk to the laboratory work force is small and is further ameliorated by redundant safety equipment, procedures, and training (see Section 2.0 and below). A lack of documentable, significant negative impacts implies that risks for the occupational safety of the laboratory work force are negligible (see Section 53). There has been only one incident in which a laboratory worker was exposed to chemical agent (Bobal, 1991). In this incident, the worker received a mustard blister on his forearm. Medical treatment was administered and the worker returned to wore No cases of botulinum intoxication associated with the handling of the toxins in laboratories like those at or in work with exposed experimental animals have been reported (CDC/NIH, 1988).

Appropriate engineering controls, SOPs, and administrative actions have been implemented to reduce or eliminate risk to personnel. All activities must be performed in compliance with federal, state, and army regulations (see Section 2.0; DA Pamphlet 385-69) In the conduct of routine operations, must comply with regulations promulgated for worker safety by various federal and state agencies (Appendix A). These requirements are included in the relevant portions of Army Regulations such as DA Pamphlet 385 -69, USAMRDC regulations, OSHA, Memoranda, and in institutional SOPs (see Section 23; Appendix B).

The historical safety record of supports the conclusions drawn above. There have been no serious exposure incidents involving chemical agents or toxins. Employee awareness, strict compliance with health and safety SOPs, and use of the appropriate containment facilities have contributed to the zero incidence of laboratory-related illnesses in the work force.

5.2.6 Social and Economic Environment

USAMRICD activities and waste stream management may slightly alter the aesthetic character of the local area. Generation of odors is associated with incineration operations (see Section 25.6) but the transient nature of these odors does not cause a significant environmental impact (see Section 4.1.12).

The operation of does not have a significant impact on noise levels in the vicinity. Vehicular traffic, predominantly passenger vehicles, generates noise at and off -site. Maintenance activities (e.g. transportation of supplies, disposal of wastes) also does not significantly increase the noise level surrounding In general, the noise environment is more strongly influenced by military aircraft activity and detonation of ordnance. There are no records of citizen complaints of excessive or objectional noise from routine operations (see Section 4.1.11).

There are no projected impacts on cultural resources since operations are being conducted within existing facilities and no existing environments are being adversely affected or altered (see Section 4.0).

USAMRICD employs approximately 260 people, approximately 70 percent of whom reside in Harford County. These employees represent approximately 2 percent of the work force of APG. Although most of the work force resides in Harford County, this labor force does not have a significant economic impact on the local community. The work force and activities of APG, however, do have a significant positive effect on the local economy (see Sections 4.1.13.1 and 4.1.13.2).

Several benefits are realized from the continuance of operations at The primary benefit is the contribution to U.S. national defense. Development of prophylactic measures against biological and chemical weapons is believed to be the major deterrent to their development or use by potential adversaries of the U.S. The recent history of chemical weapons use in the Middle East underscores the importance of continued operations at USAMRICD. Staff of USAMRICD participated in Operation Desert Shield/Storm (ODS) in 1990 and 1991. screened and evaluated hundreds of topical skin protectants (TSPs) to provide additional protection to U.S. military personnel from the vesicating effects of sulfur mustard. The staff of also conducted critical studies which led to the decision to field the anticonvulsant diazepam to protect soldiers and to treat exposure to nerve agents. During ODS, a team of instructors trained more than 1,400 allied forces health care personnel in the Medical Management of Chemical Casualties Course (M2C3) (U.S. Army Medical Research Institute of Chemical Defense, 1991). Furthermore, toxins under study at are naturally present in the environment (see Section 5.3.1), including portions of the U.S. (see Appendix 7, BDRP FPEIS) Therefore, the diseases caused by these agents remain a concern for both exposed civilians or military personnel who may be called to serve in various parts of the world. In addition, research and testing activities at contribute to a greater understanding of medical treatment.

The activities of have numerous positive impacts in the fields of defense and human health. Staff of have contributed a significant number of papers and presentations to the scientific literature (U.S. Army Medical Research Institute Chemical Defense, 1991). The activities of also contribute to the scientific community at large. Through their activities as consultants and their participation in the greater scientific community, scientists share their experiences and expertise with industrial and pharmaceutical laboratories as well as with other U.S. and foreign agencies. The staff of are considered experts in containment and medical treatment of chemical agents and tomes.

5.3 Accident and Incidents

The analysis of the site specific potential for accidents at presented below uses Maximum Credible Event (MCE) methodology (40 CFR 1502.22). MCEs are considered worst case events which realistically might occur, although the probability of such events is very low. These hypothetical events represent the most severe circumstances. Human health effects related to exposure to chemical agents (Department of the Army, 1988) and toxins (BDRP FPEIS, 1989) are dependent upon the route of exposure (e.g., inhalation, dermal, ingestion, injection). The MCEs selected for both chemical agents and tomes involve acute exposures to contaminated aerosols (the most likely circumstance).

5.3.1 Accidental Release of Chemical Agents and Toxins to the Environment

USAMRICD has developed a site-specific Maximum Credible Event (MCE) scenario for activities involving CSM. Sarin (GB), the most volatile CSM in use at was evaluated as the MCE scenario. GB is used in Building E3081. GB is also among the most toxic of the CSM for inhalation exposure. This scenario considered the worst credible event to be breakage or spillage of 1,000 milliliters of CSM. This volume is the maximum allowed quantity of CSM which can be used in a hood, but normally has less than 150 milliliters of CSM on the premises at any one time (see Section 2.4.1). In this MCE scenario, the fume hoods would exhaust all agent into the atmosphere, although the concentration of agent in the exhaust would not be in excess of the one per cent lethality criteria mandated by DoD 5154.4S. The one per cent lethality concentration is a valid criterion for evaluating potential impacts to human health of an acute exposure to agent. Because GB is the most volatile and among the most toxic CSM for aerosol exposure used at (Department of the Army, 1988; AR 50-6), additional scenarios with other CSM have less severe outcomes than this worst case event. The reasonable worst case scenario for CSM use at provides no evidence of potential significant adverse environmental impacts. Additional details of this MCE are provided in Appendix I.

The most potent toxin for which inhalation exposure is a concern at is botulinum toxin serotype A. Hypothetical release of this toxin has been evaluated previously in the BDRP FPEIS which discussed MCEs under various scenarios (Appendix J). The is a typical secondary site for execution of BDRP activities involving toxins (see Appendix 4 and Appendix 5, BDRP FPEIS). The activities, procedures, and operations used in handling the toxins at are consistent with those examined in the BDRP FPEIS (see Appendix 4 and Appendix 5, BDRP FPEIS; Section 2.0). In the MCE described in the BDRP FPEIS and provided as Appendix J of this EA, a potential laboratory centrifuge accident would aerosolize less than 0.1 percent of the amount necessary to cause human respiratory intoxication. Exhaust from the laboratory during the hypothetical accident would result in less than 0.0005 percent of the concentration required for human respiratory intoxication. This scenario provided no credible evidence of risk to the environment under routine conditions. Although does not use centrifuges in its activities with botulinum toxin, this MCE adequately addresses concerns regarding potential laboratory accidents since it has more severe consequences than any other potential laboratory accident at

Environmental control of biological air quality by HEPA filtration during routine operations is described in the CDC/NIH guidelines (CDC/NIH, 1988), in the BDRP FPEIS, Appendix 12, and in Section 2.4.2 of this document. A description of environmental control by HEGA filtration is provided in Section 2.4.2 of this document. There is no evidence that has ventilated tome material to the outside environment. The BDRP FPEIS described the physical dynamics and dispersion models for biological agents used at facilities of the BDRP (see Appendix 9, BDRP FPEIS). The maximum spread of airborne materials such as chemical agents and tomes during an accident is calculated to remain within the walls of buildings because of the state-of-the-art containment systems, biological safety cabinets, HEPA filters, HEGA filters, and the limited quantities of these materials on site (see Appendix I and Appendix J). Routine conditions at meet or are less extreme than the MCE scenarios described in the BDRP FPEIS and in Appendix I.

It is unlikely that releases of chemicals or toxins from would negatively affect native plant or wildlife species. Minimal airborne releases of chemical waste to the environment occur during routine operations (see Section 4.15). Moreover, there is no evidence that has released significant quantities of chemical agents or toxins into the environment.

The likelihood of escape of botulinum toxin outside of a facility such as has been previously considered in the BDRP FPEIS (see Appendix 9, BDRP FPEIS). The materials used at are not transmitted by plants or animals (see Appendix 7, BDRP FPEIS). Significant releases of chemical agents and toxins are both improbable and unlikely. No evidence indicating that significant amounts of chemical agents or toxins have escaped outside is available. Consequently, it is unlikely that operations have a deleterious effect on native wildlife.

5.3.2 Accidental Exposure of Laboratory Workers to Chemical Agents and Toxins

The potential threat to members of the work force in the event of a major accident involving CSM is small. In such an MCE, at-risk personnel would evacuate the accident area before being exposed to intoxicating concentrations of CSM (see Section 2.6 and Section 2.7; Appendix I). No such event has occurred in nearly 25 years of work with CSM by at this location.

The BDRP FPEIS provided an evaluation of the potential threat to the environment and humans (work force and general public) associated with the hypothetical release of botulinum toxin (Appendix J). Although toxins other than botulinum are used at (see Section 2.2; Appendix 4, BDRP FPEIS), the potential risk is the same or less since all agents handled at require the same containment and safeguards.

Chemicals and toxins must be handled at levels of safety and containment which meet or exceed all federal, state and local regulations and guidelines (see Sections 2.4.1, 2.4.2, 2.43, 2.4.4, 2.45, 25.1, 25.2, 253, 25.4, 25.5, 25.6; DA Pamphlet 385-69). Multiple, redundant containment barriers, controls, and procedures must be utilized during operations which involve chemical agents and toxins. Members of the work force must be trained in all relevant safety procedures applicable to handling chemical agents and toxins (see Sections 2.6, 2.7, 2.10.1; DA Pamphlet 385-69). Detailed examination of the safety record of supports conclusions that current safeguards and practices are sufficient to maintain work force and environmental safety in the MCDRP and medical BDRP activities conducted at USAMRICD.

5.3.3 Other Possible Modes of Release of Chemical Agents and Toxins

Additional scenarios in which chemical agents or toxins might be released from include external events such as airplane crashes, bombs, tornadoes, and floods. The probability of such external events releasing significant quantities of chemical agents is extremely small (Battelle, 1991; Chemical Research, Development and Engineering Center, 1988; Department of the Army, 1988). The BDRP FPEIS examined other possible modes of release of etiologic agents from containment laboratories (see Appendix 9, BDRP FPEIS). The assumptions and conclusions of these previous assessments are valid for MCDRP and BDRP activities conducted at since operations, procedures, and agents used at are consistent with or less extreme than the MCEs evaluated in those NEPA documents and in this EA For a large external release of chemical agents or toxins to occur, a series of catastrophic failures in multiple containment barriers must occur. External events such as airplane crashes and tornadoes might cause chemical agents and toxins to breach all levels of containment; however, they would simultaneously dilute the concentrations of the agent below those considered necessary to induce adverse effects on human health (see Appendices 7, 8, and 9, BDRP FPEIS; Department of the Army, 1988).

The total amount of chemical agents and toxins at is small in aggregate (see Section 2.4.1 and Section 2.43). Generation of vapors or an effective aerosol containing chemical agents or toxins is improbable since the majority of the particles originating from these hypothetical external events would be in the form of droplets and would quickly settle. In the event of an explosion or other external force which would generate any aerosol material, time and distance limitations would rapidly reduce the concentrations of chemical agents and toxins below threshold levels necessary to produce adverse impacts to human health (see Appendix I and Appendix J; Department of the Army, 1988; AR 50-6).

5.4 Cumulative Impacts

No negative cumulative impacts to the environment are associated with operations of Minor areas of concern were identified and included potential negative impacts to health and safety of the work force, water quality of the Bush River, Edgewood Area air quality, care and use of laboratory animals, and solid and liquid waste disposal. However, no significant impacts to the surrounding environment are attributable to the combined past, continuing, and future operations of

This analysis of activities in the context of the environmental setting revealed no evidence that any significant negative cumulative impacts will arise from the ongoing work at The U.S. Army Chemical and Biological Defense Agency (USACBDA), located in the Edgewood Area of APG, also uses small quantities of chemical agents and tomes with no significant negative environmental effects (Chemical Research, Development and Engineering Center, 1988). The MCDRP work has been performed at this specific geographical site for approximately 25 years, and the medical BDRP has been at the site for approximately 5 years with no appreciable negative impacts to either the work force or the environment. An active research program with chemical agents and toxins and related supporting activities has been conducted at since 1979 with no significant adverse environmental impacts. There is no evidence that the cumulative environmental impacts of the activities conducted by either singularly or in conjunction with other APG will result in significant adverse impacts to the environment.

Routine operations at do not result in significant impacts to air and water quality in the immediate area or affect land use patterns (see Section 4.1.1 and Section 4.15). contributes to ozone production through the commuting activities of the work force and the medical waste incinerator. However, the major source of ozone in the Baltimore and Edgewood Area is vehicular traffic associated with the general urbanization and industrialization of the area Moreover, Harford County is a designated non-attainment area for ozone. The contribution of to degradation of air quality is negligible (see Section 4.1.5). The odors of the incinerator do not significantly affect the surrounding area Air emissions from must be HEGA - HEPA-filtered to reduce potential discharge of chemical agents and toxins to the environment (see Section 2.4.2 and Section 2.45). Air pollution associated with commuting activities of the work force is negligible since the transportation corridors to are heavily utilized by other sectors of the population (see Section 5.2.3). Laboratory wastewater is decontaminated before leaving the facility (see Section 2.5.2 and Section 2.5.4). There is no evidence that the quantities of chemical and biological waste products emitted from have resulted in or will cause significant cumulative impacts to the environment. Cumulative effects of the operation of have been observed, evaluated, and do not have significant adverse impacts to the environment.

5.5 Comparison of the Proposed Action and the Alternatives

5 5.1 Alternative I - Transfer the USAMRDC Sponsored Work at to Another Location

The potential impacts associated with MCDRP and medical BDRP activities performed at are primarily site independent, i.e. the site where a particular activity is conducted is less important than the conduct of the activity itself. As stated in Section 5.1 work with tomes conducted at corresponds to the Toxins Risk/Issue category evaluated in the BDRP FPEIS. With appropriate controls in place (see Section 6.4, BDRP FPEIS) (e.g., operational, safety, etc.), the activity can be conducted without significant adverse impact to the environment. Appropriate controls are in place at and must be utilized by its personnel. The assumptions and conclusions of the BDRP FPEIS are valid for since the facility is a typical site conducting toxins work in the context of the BDRP FPEIS (see Appendix 5, BDRP FPEIS).

Construction of a new facility at another location or renovation of the existing facility have the potential for negative impacts on the environment as a result of the construction efforts. Doing the same work that is currently doing at another location would require the same controls and regulatory compliance (see Section 6.0, BDRP FPEIS); net result is envisioned to be the same; i.e., potential minor impacts on the health of the work force and no significant effects on the health and well being of the environment. Moving the work conducted at to a more industrial and/or urban setting may be less desirable because combined impacts may be unacceptable (see Section 5.4). This alternative is not envisioned to have any beneficial effect over the preferred alternative.

5.5.2 Alternative II - No Action Alternative

Because USAMRICD is a functioning organization, the alternative of "no action" would be to cease the activities presently assigned by USAMRDC to This action would cause the discontinuation of a significant part of the MCDRP and the medical BDRP. This action would eliminate the minor negative impacts (e g., insignificant contributions to the air, land, and water environments) associated with the preferred alternative.

This alternative would seriously impair the national defense posture with respect to medical countermeasures to chemical and biological warfare threats. Discontinuation of the MCDRP efforts conducted at will also weaken national defense posture towards defense against chemical agents. This effect is specifically true of since it is a major site for research and testing activities. Because no significant adverse environmental effects have been identified with the MCDRP and medical BDRP activities as they are conducted at closure of would neither significantly reduce adverse impacts nor generate significant positive environmental effects. Furthermore, closure of would result in a minor negative impact on the local economy.

5.5.3 Alternative III -Continue the Operation of in its Present Scope

This alternative includes the continued conduct of that portion of the medical BDRP and the MCDRP work now conducted at Given that the continued requirement for the MCDRP and medical BDRP work is established by the DoD and the programs are authorized by Congress, the preferred alternative in the context of the MCDRP and medical BDRP is the continued operation of USAMRICD as a research and testing laboratory. The environmental consequences of all types of activities conducted at USAMRICD given the appropriate biosafety facilities, chemical containment, equipment and practices, as well as security and other operational and regulatory controls, have been considered in this EA and found to be insignificant.

No significant environmental effects from the conduct of the MCDRP and medical BDRP at have been identified in this EA There have been no significant changes in the activities conducted at since the BDRP FPEIS was published. Likewise, no significant negative environmental effects have been demonstrated for the MCDRP efforts at Implementation of this alternative involves the continuation of such tangible but minor adverse impacts contributions to the waste stream and small risks to the health of the work force. Existing controls, which are continually upgraded as improved technologies become available, further reduce these impacts below a significant level. Implementation *of* this alternative also involves the continuation of the benefits of the MCDRP and BDRP, e.g. contributions to national defense and to the scientific community.

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6.0 CONCLUSIONS

The proposed action of continuing operation of in its present scope will have no significant adverse environmental impact and will result in important benefits to the country and the world. Routine operation of is safe and poses no significant threat to the environment. Risks to the environment associated with accidental release of toxins or chemical agents are extremely small. Benefits of continued operation far outweigh the risks.

The most severe potential effects are minor, and all actually observed effects are insignificant. Research and testing activities have been conducted at this location for nearly 25 years, and the environmental quality of the area remains unaffected by the operations of Detailed analyses of the individual activities and impacts, as well as the actual cumulative impacts of operations by other APGSA organizations,! and others in the immediate vicinity of did not reveal any significant environmental impacts. Therefore, individual and cumulative impacts of operations are minor.

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APPENDIX A

OCCUPATIONAL SAFETY AND HEALTH PROGRAM
REGULATIONS, POLICIES, AND
STANDING OPERATING PROCEDURES

APPENDIX A

SOPs, Regulations and Policies
Relevant to USAMRICD Memorandum 385-1

Executive Orders and Federal Regulations

Executive Order No. 12196

Occupational Safety and Health Act of 1970

29 CFR 1910 General Industry, Occupational Safety and Health Standards

29 CFR 1910.1200 Hazard Communication

29 CFR 1960 Basic Program Element for Federal Employee Occupational Safety Health Programs, Final Rule

Federal Acquisitions Regulation, Part 52

DoD Policy and Regulations

DoDI 6055.1 DoD Occupational Safety and Health Program

Department of the Army Policy and Regulations

AR 40-5 Preventive Medicine

AR 50-6 Chemical Surety Program

AR 50-6-1 Chemical Surety Security Program

AR 70-65 Management of Controlled Substances, Ethyl Alcohol, and Hazardous Biological Substances in Army Research, Development, Test and Evaluation Facilities

AR 380-3 Department of Army Information Security Program

AR 385-10 Army Safety Program

AR 385-30 Safety Color Code Marking and Signs

AR 385-40 Accident Reporting and Records

AR 385-64 Ammunition and Explosives Safety Standards

AR 690400 Employee Performance and Utilization

AR 700-68 Compressed Gases and Gas Cylinders

USAMRDC Policies and Regulations

USAMRDCR 385-31 Safety-Chemical Surety Materiel Mustards and L ewisite

USAMRDCR 385-102 Safety-Anticholinesterase Chemical Surety Program

USAMRDCR 385-7 Exempt Chemical Surety Materiel Program

USAMRDCR 200-1 Environmental Coordination Committee

Aberdeen Proving Ground Policies and Regulations

APGR 200-2 Solid and Hazardous Waste Management at APG

APGR 3854 APG Safety Program

APGR 385-3 Ionizing Radiation Protection

APGR 420-1 Fire Prevention and Protection Program

APGR 690-18 Employee Benefits

USAMRICD Policies and Memoranda

USAMRICD Memorandum 420-2 Evacuation Procedures for Building E3100

USAMRICD Memorandum 420-3 Evacuation Procedures for Building E3081

USAMRICD Memorandum 385-2 Safety-Radiation Protection

USAMRICD SOP 87-33-RS-GP General Provision for Chemical Surety Materiel (CSM) Bldg E3081 BB Area

USAMRICD SOP 87-335-RS-01 Laboratory Waste Water Management and

Procedures for the BB Area

USAMRICD SOP 87-335-RS-02 Hazardous Laboratory Waste Water Disposal Methods for the BB Area

USAMRICD SOP 87-335-VM-03 Veterinary Care and Husbandry of Laboratory Animals BB-Area of Bldg E3081

USAMRICD SOP 87-335-D-05 Care and Use of Laboratory Animals on Study in the BB Area E3081

USAMRICD SOP 87-335-BA-06 Cutaneous Applications of Sulfur Mustard (HD)

USAMRICD SOP 87-335-VA-07 Extraction and Analysis for CSM in Waste Water from Holding Tanks

USAMRICD SOP 87-335-VA-08 Dilution of Chemical Surety Materiel (CSM) by Gravimetry Using Organic Solvents

USAMRICD SOP 87-335-VA-10 Storage, Receipt, and Issue of Chemical Surety Materiel (CSM) and Aliquoting XCSM from Dilute CSM

USAMRICD SOP 87-335-VA-11 Dilution and/or Transfer of Liquid Chemical Surety Materiel

USAMRICD SOP 87-335-VA-12 Disposal of Detoxified Chemical Agent Waste

USAMRICD SOP 88-180-DA-18 Cutaneous Applications of Sulfur Mustard (HD) on Guinea Pigs

USAMRICD SOP 88-256-DA-20 Topical Applications of Sulfur Mustard (HD) on the I.V. 125-I-Albumin Injected Mouse Ear

USAMRICD SOP 88-266-PB-03 Dilution of HD in BB Area of E3081 from CSM to XCSM for *In Vitro* Experimentation

USAMRICD SOP 89-177-DB 04 Surety Procedures for Use During the Development of an M8 Chemical Agent Paper Based Screening Protocol Using CSM

USAMRICD SOP 89-202-VA-05 Neutralization of Alkaline Decontaminated/Detoxified Chemical Agent Waste Solution

USAMRICD SOP 89-202-DB-06 Surety Procedures for the Use of CSM During Evaluation of Topical Protectants by FT-IR Spectroscopy

USAMRICD SOP 89-317-PA-11 Cutaneous Applications of Mustard (HD) on Nude Guinea Pigs

USAMRICD SOP 87-201-RS-01 General Provisions for Exempt Chemical Surety Materiel (XCSM) with addenda

USAMRICD SOP 87-268-YN-02 Procedures for the Application of XCSM Solutions of G and V Agents to Electrophysiological Preparations

USAMRICD SOP 87-268-VA-03 Analysis of Dilute Chemical Agents (XCSM) by GC/MS and FT-IR Without the *Use of* a *Fume* Hood.

USAMRICD SOP 87-268-PB-05 Procedures for the Use of Dilute Mustards (H-Agents)

USAMRICD SOP 87-268-PB06 Implanted Osmotic Minipump Operating Procedures for Use with XCSM

USAMRICD SOP 1-1-87-1 Radioactive Material Safety Standing Operating Procedures

USAMRICD SOP 89-284-PA-09 Procedures for the Application of XCSM Solutions of GD to *In* Vitro Tissue Flasks

USAMRICD SOP SGRD-UV-VM-20 Incinerator Operations

USAMRICD SOP 8 042-02-YY Standing Operating Procedures for Use of Extremely Hazardous Materials in Inhalation Exposure Experiments

USAMRICD SOP 88-063-PB-17 Operation of Gerling-Moore Model 4104 Metabostat Laboratory Type Microwave Heating System

USAMRICD SOP 4-1-87-1 Radiology Equipment and Safe Operation

USAMRICD SOP 89-206-DB-07 Development of a Screening Procedure for Use in the Evaluation of Solid Decontaminants and Reactive Topical Protectants Against Chemical Agent Simulants

USAMRICD SOP 89-206-DB-08 Decontamination/Sorption of Volatile, Toxic Compounds

USAMRICD SOP 89-312-YY-10 The Handling *of Staphylococcal* Enterotoxin B

USAMRICD Memorandum SGRD-UV-AR, 12 Dec 89; Subject: Performance Standards for Supervisors

Technical Guides and Bulletins

TB Med 502 Respiratory Protection Program

TB Med 503 The Army Industrial Hygiene Program

TB Med 506 Occupational and Environment Health Occupational Vision

USAEHA TG 156 Questions and Answers of Video Display Terminals

USAEHA TG 169 Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agents, GA, GB, GD and VX

USAEHA TG 173 Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H. HD and HT

American National Standards Institute 241.1-1967 Men's Safety-Toe Footwear

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APPENDIX B

USAMRICD STANDING OPERATING PROCEDURES

APPENDIX B

USAMRICD STANDING OPERATING PROCEDURES

SOP 10 Surgery

SOP 17 Non Human Primate Colony

SOP 20 Incinerator Operation

SOP 22045-1 Charge of Quarters

SOP 22045-2 Duty Driver

SOP 2-1-83-2 SOP for Safe Operation of Class III B High Energy Laser System

SOP 90-033-YY-01 SOP for Phosgene Exposure of Cell Culture

SOP 90-276-DB-03 Procedures for Handling Chemical Compounds

SOP 90-282-RS-04 Radioactive Materials Safety SOP

SOP 91-077-DB-03 General Provisions for the Handling of Human Blood During Research Operations

SOP 91-077-RS-02 General Provisions for Biosafety Operations

SOP 91-077-RS-04 General Provisions for Clinical Microbiological Operations

SOP 91-203-YY-06 Standing Operating Procedures for Exposures to Pulmonary Toxicants

SOP 91-275-PB-07 Cyanide Safety Standing Operating Procedures

SOP 91-317-YY-08 SOP for Exposure of Cell Cultures to Edemagenic Gases

SOP 88-063-PB-17 Operation of Gerling-Moore Model 4104 Metabostat Laboratory Type Microwave Heating System

SOP 4-1-87-1 Radiology Equipment and Safe Operation

VMB Memo 40-24 Radiology Equipment and Safe Operation

SOP 89-2090DB-07 Development of a Screening Procedure for Use in the Evaluation of Solid Decontaminants and Reactivity, Etc.

SOP 1-1-87-1 Radioactive Material Safety Standing Operating Procedures

SOP 8 042-02-YY Standing Operating Procedures for Use of Extremely Hazardous Materials in Inhalation Exposure Experiments

Standing Operating Procedures Relative to XCSM

SOP 87-201-RS-01 General Provisions for Exempt Chemical Surety Materiel (XCSM)with addenda

Addendum A
SOP 87-201-XX-OlA Procedures for Dilution of XCSM and Filling Containers in a Fume Hood

Addendum B
SOP 87-201-XX-OlB Procedures of Injection of XCSM Solutions of G- and V-type Agents Without the Use of a Fume Hood

Addendum C
SOP 87-201-XX-OlC Procedures for Injections of XCSM Solutions of G and V Agents in to Animals with the Use of a Fume Hood

Addendum D
SOP 87-201-XX-OlD Procedures for Use of XCSM Solutions of G and V Agents in Analytical Instruments

Addendum F
SOP 87-201-XX-01F Procedures for the Use of XCSM Solutions of G and V Agents in *In Vitro* Preparations

Addendum J
SOP 87-201-XX-01J Procedures for Storage and Issue of XCSM

SOP 87-201-YN-02 Procedures for Application of XCSM Solutions of G and V Agents to Electrophysiological Preparations

SOP 87-268-YN-02 Procedures for the Application of XCSM Solutions of G and V Agents to Electrophysiological Preparations

SOP 87-268-VA-03 Analysis of Dilute Chemical Agents (XCSM) by GC/MS and FT Without the Use of a Fume Hood.

SOP 87-26B-XX-04 Procedures for Operation with Dilute Solutions of Radiolabelled Chemical Surety Materiel (Radiolabelled XCSM)

SOP 87-268-XX-05 Procedures for the Use of Dilute Mustards (H-Agents)

SOP 87-268-PB-05 Procedures for the Use of Dilute Mustards (H-Agents)

SOP 87-268-PB-06 Implanted Osmotic Minipump Operating Procedures for Use with XCSM

SOP 89-284-PA-09 Procedures for the Application of XCSM Solutions of GD to *In* Vitro Tissue Flasks

Standing Operating Procedures Relative to CSM

SOP 87-335-RS-GP General Provision for Chemical Surety Materiel (CSM) Bldg E3081 BB Area

SOP 87-335-RS-01 Laboratory Waste Water Management and Procedures for the BB - Area

SOP 87-335-RS-02 Hazardous Laboratory Waste Water Disposal Methods for the BB Area

SOP 87-335-VM-03 Veterinary Care and Husbandry of Laboratory Animals BB-Area of Bldg E3081

SOP 87-335-D-05 Care and Use of Laboratory Animals on Study in the BB Area E3081

SOP 87-335-VA-06 Cutaneous Applications of Sulfur Mustard (HD)

SOP 87-335-VA-07 Extraction and Analysis for CSM in Waste Water from Holding Tanks

SOP 87-335-VA-08 Dilution of Chemical Surety Materiel (CSM) by Gravimetry Using Organic Solvents

SOP 87-335-VA-09 Dilution of CSM by Gravimetry Using Solvents of Low Volatility

SOP 87-335-VA-10 Storage, Receipt, and Issue of Chemical Surety Materiel (CSM) and Aliquoting XCSM from Dilute CSM

SOP 87-335-VA-11 Dilution and/or Transfer of Liquid Chemical Surety Materiel

SOP 87-335-VA-12 Disposal of Detoxified Chemical Agent Waste

SOP 88-180-DA-18 Cutaneous Applications of Sulfur Mustard (HD) on Guinea Pigs

SOP 8-256-DA-20 Topical Applications of Sulfur Mustard (HD) on the I.V. Albumin Injected Mouse Ear

SOP 88-266-PB-21 Procedure for Adding Diluent to Radiolabeled CSM

SOP 88-288-VA-22 Subcutaneous Administration of Sulfur Mustard (HD) in the Rat

SOP 89-079-DA-02 Cutaneous Applications of Sulfur Mustard (HD) in the Rat

SOP 89-097-PB-03 Dilution of HD is BB Area of E3081 from CSM to XCSM for In Vitro Experimentation

SOP 89-177--04 Surety Procedures for Use During the Development of M8 Chemical Agent Paper Based Screening Protocol Using CSM

SOP 89-202-VA-05 Neutralization of Alkaline Decontaminated/Detoxified Chemical Waste Solution

SOP 89-202-DB-06 Surety Procedures for the Use of CSM During Evaluation of Topical Protectants by FT-IR Spectroscopy

SOP 89-317-PA-11 Cutaneous Applications of Mustard (HD) on Nude Guinea Pigs

SOP 91-067-DB-01 Surety Procedures for Cutaneous Applications of Sulfur Mustard on the Skin of Laboratory Animals

SOP 91-077-RS-02 General Provisions for Biosafety Operations

SOP 91-322-VM-09 Surety Procedures for Intra-Wound Applications of Sulfur Mustard (HD) of Laboratory Animals

SOP 89-206-DB 07 Development of a Screening Procedure for Use in the Evaluation of Solid Decontaminants and Reactive Topical Protectants Against Chemical Agent Simulants

SOP 89-206-DB-08 Decontamination/sorption of Volatile, Toxic Compounds

SOP 89-312-YY-10 The Handling of *Staphylococcal* Enterotoxin B

Memorandum SGRD-UV-AR, 12 Dec 89; Subject: Performance Standards for Supervisors

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APPENDIX C

SAMPLE FORMS

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Annex C

TOXIC CONTAINER
(See CRDECR 385-1; Safety Ofc)

The contents of this container are:

a. Name, symbol, or code number of agents.
XGD; XGB

b. Quantity (ml, 1, gal, lb, etc.). TRACE

c. The agent (is) ~~(is not)~~ detoxified and all toxic material contained herin is within double sealed containers.

(Signature) Users Signature

Name (Printed) Users Name

Agency USAMRICD, branch name

Phone number ext XXXX

SMCCR Form 1008, 1 Aug 86 replaces DRDAR-CL Form 699, Sep 78 which is obsolete.

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MAT[illegible]RIEL COUR[illegible]ER RECEIPT

USAMRICD

[illegible]ATION CASY

[illegible]hemical Area Storage Yard

[illegible]ify by my signature that I have received the materiel listed on this form and am aware of the [illegible]cable safety and security requirements.

SUPPLY ACCOUNT NUMBER

SUPPLY ACCOUNT NUMBER

PRIVACY ACT STATEMENT

AUTHORITY: 5 U.S.C. [illegible] (PL 93 579).
PRINCIPLE PURPOSES: To provide a receipt for transfer of controlled materiel. The use of the SSAN is required and is necessary to provide positive identification of the individuals receipting for the materiel.
ROUTINE USES: To document transfer of materiel from a shipper to a courier, courier to courier and/or receiver.
DISCLOSURE IS VOLUNTARY: Since the SSAN must be used, refusal to provide SSAN may be grounds for action to remove the individual concerned from duties involving the materiel transferred by use of this form.

SHIPMENT TRANSFERS

LOCATION OF TRANSFER: USAMRICD		DATE (YR/MO/DAY): 87607-20
[illegible]IENT'S PRINTED NAME (LAST, FIRST, M.I.): [illegible]lusion Area NCOIC (Representative)	ORGAN. OR ACCOUNT NO.: USAMRICD	
[illegible]ATURE	SOCIAL SECURITY NUMBER: 999-99-9999	
LOCATION OF TRANSFER: Bldg E3081		DATE (YR/MO/DAY)
[illegible]PIENT'S PRINTED NAME (LAST, FIRST, M.I.)	ORGAN. OR ACCOUNT NO.: USATEU	
[illegible]IATURE	SOCIAL SECURITY NUMBER	
LOCATION OF TRANSFER		DATE (YR/MO/DAY)
[illegible]IPIENT'S PRINTED NAME (LAST, FIRST, M.I.)	ORGAN. OR ACCOUNT NO.	
[illegible]NATURE	SOCIAL SECURITY NUMBER	
LOCATION OF TRANSFER		DATE (YR/MO/DAY)
[illegible]CIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)	ORGAN. OR ACCOUNT NO.	
[illegible]GNATURE	SOCIAL SECURITY NUMBER	
LOCATION OF TRANSFER		DATE (YR/MO/DAY)
[illegible]ECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)	ORGAN. OR ACCOUNT NO.	
[illegible]IGNATURE	SOCIAL SECURITY NUMBER	

C-2

SHIPMENT DESCRIPTION

LINE NUMBER	QUANTITY	SERIAL NUMBERS	REMARKS
1	1	1-24 gal	Drum contains decon CA, CB, GD Solid Waste
2	1	1-24 gal-1	Drum contains decon GA, GB, GD Solid Waste
3	1	1-24 gal	Drum contains decon CA, CB, GD Solid Waste
4	1	1-24 gal	Drum contains decon CA, CB, GD Solid Waste
5	1	1-24 gal	Drum contains decon CA, CB, CD Solid Waste
6	1	1-24 gal	Drum contains decon CA, CB, CD Liquid Waste
7	1	1-24 gal	Drum contains decon CA, CB, CD Liquid Waste

Pallets

The materiel listed above has been decontaminated to the XXX level with 2.5 N Sodium Hydroxide or 5% Sodium hypochlorite as appropriate.

This waste materiel contains no constituent that could cause an explosive condition of processed through a high temperature incinerator.

This waste materiel contains no asbestos.

This waste materiel meets the requirements set forth in CRDEC Reg 385-1

Exclusion Area NCOIC (Representative)
Chemical Exclusion Area

D FORM [illegible]
[illegible]82 MAY

PREVIOUS EDITION MAY [illegible] D UNTIL 31 DEC 82.

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LIQUID WASTE TURN-IN
CERTIFICATION SHEET

(this certificate to accompany DD 1911)

1. Total quantity of waste in the 55 Gal Polyethylene Lined Drum:

50 gal

2. Detoxified agent and decontamination solution and percent volume of deconned liquid:

GA, GD: 2.5N NaOH & 5% bleach; 90% decon liquid

3. Percent volume of each Appendix V constituent from Code of MD Regulation 10.51.02.17F (encl):

None

4. Percent volume of any other individual organic/inorganic material:

None

5. Generator certification:

I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and that no deliberate or willful omission of the composition exists and that all known or suspected hazards have been disclosed.

Generator's Authorized Signature: John Brown

Generator's Name/Title
John Brown/Chemist

Mary Doe

Submitted by
Mary Doe

Date of container closure

Date

Date of Turn-IN

Date

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ICD'S USER
LIQUID WASTE TURN-IN

CERFITICATION SHEET

(this certificate to accompany SMCCR Form 1008)

1. Size of container and total quantity of waste in the container:

5 gal container; 4.5 gal

2. Detoxified agent and decontamination solution and percent volume of deconned liquid:

GD, 2.5N NaOH and 5% bleach; 90% decon liquid

3. Percent volume of each Appendix V constituent from Code of MD Regulation 10.51.02.17F (encl):

None

4. Percent volume of any other individual organic/inorganic material:

None

5. Generation certification:

I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and that no deliberate or willful omission of the composition exists and that all known or suspected hazards have been disclosed.

Generator's Authorized Signature:

User's Name //Title
Jay Jones/Bio Tech

Submitted by
May Day

Date of container/bag closure

Date

Date of Turn-IN

Date

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(DA PAM 710-2)

1. SEND TO: Analytical Chemistry Branch
Exclusion Area NCOIC

2. REQUEST FROM: Branch Name
User Name and telephone ext

XX TURN-IN

5. DATE MATERIAL REQUIRED

6. DODAAC N/A

7. PRIORITY

8. ACCOUNTING/FUNDING DATA

8. END ITEM IDENT

9a. NAME/MANUFACTURER N/A

9b. MODEL

9c. SERIAL NO.

10. PUBLICATION

11. JOB ORDER NO.

*CODE — ISSUE: I - Initial; R - Replacement. TURN-IN: FWT—Fair Wear And Tear; RS—Report of Survey; EX—Excess; SC—Stmt of Charges

12. ITEM NO. a	STOCK NO. b	ITEM DESCRIPTION c	UNIT OF ISSUE d	QUANTITY e	CODE* f	SUPPLY ACTION g	UNIT PRICE h	TOTAL COST i	POSTED: DATE	POSTED: BY
1	N/A	Detoxified chemical agent solid waste	lbs	15	T/I					
2	N/A	Detoxified chemical agent liquid waste	gal	5	T/I					
3	N/A	Detoxified chemical agent glass and syringe solid waste container	lbs	2	T/I					

Supervisor's statement:
a. All solid waste has been decontaminated to the 3x (XXX) level.
b. This waste material contains no constituents that could, in any way, cause an explosion condition if processed through a high temperature incinerator which includes no sealed containers.
c. The certificates of Hazardous Constituents and SMCCR 1008 forms have been properly completed for each item listed.

Branch Chiefs Signature
Branch Chief's Name
~~Rank or Rating~~
Branch Name

EXAMPLE

SHEET TOTAL

GRAND TOTAL

13. ISSUE/TURN-IN "QUANTITY" COLM IS REQUESTED	DATE	BY	14. ISSUE QTY IN "SUPPLY ACTION" COLUMN	DATE	BY	15. REC QTY IN "SUPPLY ACTION" COLUMN	DATE	BY
	present	User's Signature					present	Exclusion Area Personnel Signature

REPLACES EDITION OF JUN 73 WHICH WILL BE USED UNTIL EXHAUSTED.

* U.S. GOVERNMENT PRINTING OFFICE

DA FORM 2765-1, MAY 1977

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Safety Standing Operating Procedures

Title: Hazardous Laboratory Waste Water Disposal Methods for the BB Area

Operator's Statement:

I have read and fully understand the contents of SOP No. ______________ and agree to abide by these instructions throughout my assignment to the operation described herein.

PRINTED NAME	SIGNATURE	DATE

Supervisor's Statement: I have reviewed this SOP for accuracy of procedures and adequacy of safety measures. Changes, if any, have been noted and the Safety Officer has been notified of these changes.

SCHEDULED REVIEW	REVIEW PERFORMED	NAME	SIGNATURE

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KIRK U.S. ARMY HEALTH CLINIC
ATTN: HSXR-APG-PM
AA 278-2225
EA 671-2401

Lab Hood Certification

This hood meets the requirements for the following work:

______ Toxic/Surety
(TLV <10ppm)
______ General Chemistry
______ Glove Box

At this maximum working height: ______________
Avg face velocity/manometer reading: ______________

Date of Inspection: ______________

Expiration Date: ______________

Inspected By: ______________

Industrial Hygiene Section

HSXR-APG-Z. LABEL 31, 1 Apr 90

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APPENDIX D

NUCLEAR REGULATORY COMMISSION LICENSE

NRC FORM 374 (10-89)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Department of the Army Medical Research Institute of Chemical Defense	3. License number 19-00294-24
2. Aberdeen Proving Ground, Maryland 21010-5425	4. Expiration date February 28, 1996 5. Docket or Reference No. 030-31110

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Hydrogen 3	A. Any	A. 30 curies
B. Carbon 14	B. Any	B. 4 curies
C. Phosphorus 32	C. Any	C. 2 curies
D. Sulfur 35	D. Any	D. 2 curies
E. Calcium 45	E. Any	E. 2 curies
F. Iodine 125	F. Any	F. 2 curies
G. Nickel 63	G. Plated foils	G. Not to exceed 15 millicures per foil and 3.5 curies total
H. Cesium 137	H. Sealed sources	H. Not to exceed 300 microcuries per source and 500 microcuries total

9. Authorized use

A. through F. Research and development as defined in Section 30.4(q) of 10 CFR Part 30, including animal studies.

H. For calibration of instruments.

CONDITIONS

10. Licensed material may be used only at the licensee's facilities at the Edgewood Area, Aberdeen Proving Ground, Maryland.

11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the licensee's Radiation Safety Committee, David E. Lenz, Chairman.

B. The Radiation Safety Officer for this license is Benjamin F. Casole.

12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed 3 years.

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APPENDIX E

USAMRICD MEDICAL WASTE INCINERATOR PERMITS AND MDE INSPECTION REPORTS

KEEP PERMIT AT SITE

CONTROL NO. № 2299

State of Maryland

DEPARTMENT OF THE ENVIRONMENT

AIR MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY
BALTIMORE, MARYLAND 21224

William Donald Schaefer
Governor

Robert Perciasepe
~~Martin W. Walsh, Jr.~~
Secretary

[ ] Construction Permit [X] Operating Permit

PERMIT NO. 12-00082

Date Issued November 1, 1991

PERMIT FEE $200.00

Expiration Date October 31, 1992

LEGAL OWNER & ADDRESS	SITE
Commander, Aberdeen Proving Ground Aberdeen Proving Ground, MD 21005-5131 Attention: STEAP-SH-EE Mr. Donald Green Building E-4430	Building E-3081 Edgewood Area Harford County

SOURCE DESCRIPTION

One Burn-Zol Model 272 oil-fired infectious waste incinerator rated at 375 lbs./hr. located at USAMRICD, Building E-3081.

This permit is issued subject to the attached terms and conditions, and compliance with all applicable laws and regulations.

Page 1 of 3

Program Administrator

Director, Air Management Administration

AMA-1 (Rev. 10-1-89)
MDE 120

(NOT TRANSFERABLE)

ABERDEEN PROVING GROUND, EDGEWOOD AREA
OPERATING PERMIT NO. 12-00082

This permit is subject to the following terms and conditions:

Part A - General

1. Except as otherwise provided in the following provisions, the Company's application is incorporated as part of this Permit to Operate. That application consists of the original application signed by the Company on September 13, 1991 and all amendments to the application. If there are any discrepancies between the permit conditions specified below and the application, the conditions on this permit will take precedence.

2. Right of Entry:

   The Secretary, Department of the Environment, or the Secretary's authorized representative, including inspectors of the Air Management Administration shall be afforded access to the Company's property, at reasonable times and upon presentation of credentials:

   a. to determine compliance with the permit and applicable regulations;
   b. to sample any waste, air, or discharge into the atmosphere;
   c. to inspect any monitoring equipment required by this permit or applicable regulations;
   d. to have access to and copy any records required to be kept by this permit or by applicable regulations; and
   e. to obtain any photographic documentation or evidence.

3. The sources and equipment covered by this permit are subject to:

   a. all rules and regulations of Title 26. Subtitle 11, Air Quality, of the Code of Maryland Regulations including specific requirements that appear at COMAR 26.11.08;
   b. all terms and conditions required by construction permits, NSINA approvals, and PSD approvals issued by the Department unless superseded by subsequent permits.

4. Severability: If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect, and such invalid provision shall be considered severed and deleted from this permit.

5. Nothing in this permit authorizes the violation of any rule or regulation nor the creation of a nuisance or air pollution.

6. The Company shall report periods of excess emissions to the Department as required by COMAR 26.11.01.07.

Part B - Operation

1. The Company shall keep all air pollution control equipment, including the barometric damper, properly maintained and in good working order so as to assure full and continuous compliance with all applicable regulations.

2. The control panel instrumentation for all process and control equipment shall be kept properly maintained and operating at all times so as to accurately indicate operating conditions.

3. The Company shall operate the Burn-Zol incinerator with a minimum primary chamber temperature of 1000°F and a minimum secondary chamber temperature of 1800°F.

4. The Company shall not process more than 780,000 lbs. of material in any year.

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STATE OF MARYLAND-DEPARTMENT OF THE ENVIRONMENT
Air Management Administration
2500 Broening Highway
Baltimore, Maryland 21224

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

18

I. PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD — Bldg E3081
PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander, USAAPGSA
ATTN: STEAP-CO, Aberdeen Proving Ground, MD 21005-5001 — Harford
PREMISE ADDRESS — COUNTY

II. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, Burn-201	375	20016 80
2	Model # 272 incinerator		

III. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal parts/animal bedding
2		

IV. DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
1	After burner with barometric damper	0.051gr/DSCF
2		

V. ☐ Yes ☐ No ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ______
Date

MICHAEL F. FLANNERY, JR.
Director, Safety, Health and Environment
SIGNATURE AND TITLE

September 13, 1991
DATE

AMA-27

The TAP demonstration for the Burn-Zol was based on one hundred sixty charges per year and is clearly a mistake as over three hundred fifty charges were made in '91. The consultant is remodeling the emissions from the incinerator, and it is anticipated that no limiting permit conditions will be required (the off-site concentrations of compounds from the incinerator were well below the screening levels).

A 350 lb. charge of animal bedding into the incinerator was observed, and no visible emissions were seen during the twelve minute observation. The unit appears to be well maintained and operated properly. The incinerator is due to be replaced, and an application for a Permit to Construct was submitted to the Department for the replacement. The incinerator, designed with a packed bed scrubber, was not expected to be able to meet the particulate standard so the unit is being redesigned with a high efficiency scrubber. Applications will be resubmitted, and it is hoped that the new unit will be operational by December, 1992. The Burn-Zol will remain in operation during construction of the new unit, but will be dismantled after the new unit becomes functional.

The DECON/DETOX incinerator was inspected on January 23, 1991; this facility is not subject to a Permit to Operate, but is included here for information.

The DECON/DETOX incinerator at Edgewood was inspected to determine compliance with Maryland's air quality regulations. The operations at the facility are regulated by an RCRA hazardous waste incinerator permit (for reactives, corrosives, and phosi-water) and COMAR 26.11.08, Control of Incinerators.

The DECON/DETOX incinerator (2-0015) is used to decontaminate/detoxify materials which have been exposed to nerve agents, and to dispose of liquids contaminated with nerve agents. The facility incinerates only materials which have first been chemically decontaminated. Materials incinerated include decontamination chemicals, filter media, lab waste, and construction/demolition debris. Liquids arrive at the facility in 55 gallon drums and 250 gallon totes. Solid materials arrive packaged in a variety of ways: drums, metal boxes, etc. All solid materials arrive packaged such that they can be incinerated without further handling or unpackaging.

The incinerator is a two chamber incinerator with a caustic scrubber for pollution abatement. The incinerator was specified to handle nerve agents, so a variety of safety features are built into the unit and incorporated in the standard operating procedures. A single burn takes about twelve hours, ninety minutes of which is incineration of the charge at temperature. A burn begins with activation of the scrubber. Next, the secondary chamber is brought up to operating temperature (1600°F). The secondary chamber must be brought up to temperature first because the primary chamber is equipped with an emergency abort which exhausts prior to the secondary chamber. Interlocks are in place to prevent start-up of the primary chamber prior to the secondary reaching operating temperature. Hence, any untreated emissions from a primary chamber emergency (over-temperature or over-pressure) would be treated by the secondary chamber and the scrubber. The system also has duplicate parallel fans and pumps for all systems that are considered critical to preventing the escape of contaminated gases. Next, the primary chamber is charged (usually with 1000 to 3000 pounds of material) by placing the materials to be incinerated into the hearth car and placing the hearth car in the chamber. The hearth car enters the chamber on rails. After charging, the primary chamber is brought to operating temperature (1200°F, 2 second dwell time). The charge is held for ninety minutes at temperature, and then the cool down cycle begins. All temperature changes are accomplished at no more than 300°F change per hour to minimize thermal shock to the refractory (this practice accounts for the twelve hour cycle time).

Liquids are charged into the primary chamber by injection once the primary chamber is up to temperature. Solids and liquids can be incinerated simultaneously. The liquids are sprayed across the burner flames to assure mixing. Drums and totes are placed on pallets at one of two intakes which are located beside the incinerator. Each intake consists of a section of pipe (with a collar) at the end of a length of flexible hose. When operating temperature is reached in the primary chamber, the appropriate valves are opened and the liquid is pumped at a controlled rate into the incinerator. Ash from the incinerator is treated as potentially hazardous waste - each batch of ash is tested for hazardous constituents, and disposed of accordingly.

The scrubber is operated with the scrubbing liquor kept at pH 8 to 9 using sodium hydroxide. The system continually treats and recycles the scrubbing water. From the scrubber, the water is treated with a flocculent, filtered, and clarified before going back to the scrubber. Once per year the scrubber water is carbon filtered to remove heavy metals and is discharged to the sanitary sewer (about 6000 gallons). Filter media are disposed of as hazardous waste.

The incinerator has strip charts recording primary and secondary chamber temperatures, and carbon monoxide. The incinerator burns an average of 465 gallons of no. 2 fuel oil per day, and incinerated 48,133 pounds of waste in calendar year '90. The facility is currently supervised by Tim Blades under the cognizance of the Environmental Quality Division of CRDEC. Don Green should be contacted to arrange appointments to inspect the facility.

12-00082

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KEEP PERMIT AT SITE

CONTROL NO. 001194

State of Maryland

DEPARTMENT OF THE ENVIRONMENT

AIR MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY
BALTIMORE, MARYLAND 21224

William Donald Schaefer
Governor

Robert Perciasepe
~~Martin W. Walsh, Jr.~~
Secretary

☐ Construction Permit ☒ Operating Permit

PERMIT NO. 12-00082 Date Issued November 1, 1990

PERMIT FEE $200.00 Expiration Date October 31, 1991

LEGAL OWNER & ADDRESS	SITE
Commander, Aberdeen Proving Ground Aberdeen Proving Ground, MD 21005-5131 Attention: STEAP-SH-EE Mr. Donald Green Bldg. E-4430	Building E-3081 Edgewood Area Harford County

SOURCE DESCRIPTION

One Burn-Zol Model 272 oil-fired infectious waste incinerator rated at 375 lb/hr. located at USAMRICD, Building E-3081.

This permit is issued subject to the attached terms and conditions, and compliance with all applicable laws and regulations.

Page 1 of 3

Program Administrator

Director, Air Management Administration

AMA-1 (Rev. 10-1-89)
MDE 130

(NOT TRANSFERABLE)

This permit is subject to the following terms and conditions:

Part A - General

1. Except as otherwise provided in the following provisions, the Company's application is incorporated as part of this Permit to Operate. That application consists of the original application signed by the Company on November 8, 1990 and all amendments to the application. If there are any discrepancies between the permit conditions specified below and the application, the conditions on this permit will take precedence.

2. Right of Entry:

   The Secretary, Department of the Environment, or the Secretary's authorized representative, including inspectors of the Air Management Administration shall be afforded access to the Company's property, at reasonable times and upon presentation of credentials:

   a. to determine compliance with the permit and applicable regulations;
   b. to sample any waste, air, or discharge into the atmosphere;
   c. to inspect any monitoring equipment required by this permit or applicable regulations;
   d. to have access to and copy any records required to be kept by this permit or by applicable regulations; and
   e. to obtain any photographic documentation or evidence.

3. The sources and equipment covered by this permit are subject to:

   a. all rules and regulations of Title 26. Subtitle 11, Air Quality, of the Code of Maryland Regulations including specific requirements that appear at COMAR 26.11.08;
   b. all terms and conditions required by construction permits, NSINA approvals, and PSD approvals issued by the Department unless superseded by subsequent permits;

4. Severability: If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect, and such invalid provision shall be considered severed and deleted from this permit.

5. Nothing in this permit authorizes the violation of any rule or regulation nor the creation of a nuisance or air pollution.

6. The Company shall report periods of excess emissions to the Department as required by COMAR 26.11.01.07.

Part B - Operation

1. The Company shall keep all air pollution control equipment, including the barometric damper, properly maintained and in good working order so as to assure full and continuous compliance with all applicable regulations.

2. The control panel instrumentation for all process and control equipment shall be kept properly maintained and operating at all times so as to accurately indicate operating conditions.

3. The Company shall operate the Burn-Zol incinerator with a minimum primary chamber temperature of 1000°F and a minimum secondary chamber temperature of 1800°F.

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STATE OF MARYLAND-DEPARTMENT OF THE ENVIRONMENT
Air Management Administration
2500 Broening Highway
Baltimore, Maryland 21224

AIR MANAGEMENT ADMINISTRATION

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

I. PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD — Bldg E3081
PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander, USAAPGSA
ATTN: STEAP-CO, Aberdeen Proving Ground, Md 21005-5001 — Harford
PREMISE ADDRESS — COUNTY

II. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, Burn-201	375	20016 80
2	Model # 272 incinerator		

III. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal parts/animal bedding
2		

IV. DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
1	After burner with barometric damper	0.051gr/DSCF
2		

V. ☐ Yes ☐ No ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ______________
Date

Robert W. Mortis

ROBERT W. MORTIS
Colonel, U.S. Army, Commander, APGSA
SIGNATURE AND TITLE

8 NOV 1990
DATE

DO NOT WRITE BELOW THIS LINE

FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Jason A. Kerpelman	1-23-91	Barry Adams

DISCUSSION, CONDITIONS AND RECOMMENDATION:

The Burn-Zol infectious waste incinerator at APG - Edgewood was inspected to determine compliance with Maryland's air quality regulations. The operations at are regulated by COMAR 26.11.08, Control of Incinerators.

The incinerator (2-0016) is located at Building E-3081, the USA Biomedical Laboratory, where animal carcasses and animal bedding are generated as waste, but the facility also incinerates infectious contaminated materials from Aberdeen, CRDEC, AEHA, and the Kirk Army Medical Hospital. The material arrives at the facility in red garbage bags which indicate that the bags contain infectious waste. The bags are loaded into bins which can be fitted to a lift on the incinerator for charging. Animal bedding generated within the facility is dumped from the cages at a central location, and air conveyed to a large hopper at the incinerator. The bedding consists of coarse sawdust and ground corn cobs. From the hopper, the bedding material is screw conveyed into the charging pit. Charges are rammed hydraulically into the incinerator from the charging pit. The incinerator is brought to operating temperature in the morning and left running all day. As material arrives at the facility it is incinerated, with one to two hours between charges. At the end of the day the incinerator is left running with an automatic cool down timer in control - the timer provides a four hour cool down. The incinerator is busiest on Mondays, Wednesdays, and Fridays, which are the days the animal cages are cleaned, and the incinerator operates 8 hours per day (plus four hours cool down), 5 days per week, 260 days per year. In FY '90, the incinerator used 360,483 gallons of no. 2 fuel oil, and processed 218,200 pounds of waste.

At the time of the inspection the incinerator primary chamber was operating at 1280°F (set point 1200°F) and the secondary chamber at 1980°F (set point 1750°F). The current operating permit does not specify minimum operating temperatures, but a permit condition will be added to specify a minimum of 1000°F for the primary chamber and 1800°F for the secondary chamber (which are the Department's standard regulatory operating parameters for special medical waste incinerators).

A charge of animal bedding into the incinerator was observed, and no visible emissions were generated during the burn. The unit appears to be well maintained and operated properly.

The DECON/DETOX incinerator was also inspected; however, this facility is not subject to a permit to operate.

The DECON/DETOX incinerator at Edgewood was inspected to determine compliance with Maryland's air quality regulations. The operations at the facility are regulated by an RCRA hazardous waste incinerator permit (for reactives, corrosives, and phosi-water) and COMAR 26.11.08, Control of Incinerators.

The DECON/DETOX incinerator (2-0015) is used to decontaminate/detoxify materials which have been exposed to nerve agents, and to dispose of liquids contaminated with nerve agents. The facility incinerates only materials which have first been chemically decontaminated. Materials incinerated include decontamination chemicals, filter media, lab waste, and construction/demolition debris. Liquids arrive at the facility in 55 gallon drums and 250 gallon totes. Solid materials arrive packaged in a variety of ways: drums, metal boxes, etc. All solid materials arrive packaged such that they can be incinerated without further handling or unpackaging.

The incinerator is a two chamber incinerator with a caustic scrubber for pollution abatement. The incinerator was specified to handle nerve agents, so a variety of safety features are built into the unit and incorporated in the standard operating procedures. A single burn takes about twelve hours, ninety minutes of which is incineration of the charge at temperature. A burn begins with activation of the scrubber. Next, the secondary chamber is brought up to operating temperature (1600°F). The secondary chamber must be brought up to temperature first because the primary chamber is equipped with an emergency abort which exhausts prior to the secondary chamber. Interlocks are in place to prevent start-up of the primary chamber prior to the secondary reaching operating temperature. Hence any untreated emissions from a primary chamber emergency (over-temperature or over-pressure) would be treated by the secondary chamber and the scrubber. The system also has duplicate parallel fans and pumps for all systems that are considered critical to preventing the escape of contaminated gases. Next, the primary chamber is charged (usually with 1000 to 3000 pounds of material) by placing the materials to be incinerated into the hearth car and placing the hearth car in the chamber. The hearth car enters the chamber on rails. After charging, the primary chamber is brought to operating temperature (1200°F, 2 second dwell time). The charge is held for ninety minutes at temperature, and then the cool down cycle begins. All temperature changes are accomplished at no more than 300°F change per hour to minimize thermal shock to the refractory (this practice accounts for the twelve hour cycle time).

Liquids are charged into the primary chamber by injection once the primary chamber is up to temperature. Solids and liquids can be incinerated simultaneously. The liquids are sprayed across the burner flames to assure mixing. Drums and totes are placed on pallets at one of two intakes which are located beside the incinerator. Each intake consists of a section of pipe (with a collar) at the end of a length of flexible hose. When operating temperature is reached in the primary chamber, the appropriate valves are opened and the liquid is pumped at a controlled rate into the incinerator. Ash from the incinerator is treated as potentially hazardous waste - each batch of ash is tested for hazardous constituents, and disposed of accordingly.

The scrubber is operated with the scrubbing liquor kept at pH 8 to 9 using sodium hydroxide. The system continually treats and recycles the scrubbing water. From the scrubber, the water is treated with a flocculent, 1filtered, and clarified before going back to the scrubber. Once per year the scrubber water is carbon filtered to remove heavy metals and is discharged to the sanitary sewer (about 6000 gallons). Filter media are disposed of as hazardous waste.

The incinerator has strip charts recording primary and secondary chamber temperatures, and carbon monoxide. The incinerator burns an average of 465 gallons of no. 2 fuel oil per day, and incinerated 48,133 pounds of waste in calendar year '90. The facility is currently supervised by Tim Blades under the cognizance of the Environmental Quality Division of CRDEC. Don Green should be contacted to arrange appointments to inspect the facility.

12-00082

OK, BFC

POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF THE ENVIRONMENT
2500 BROENING HIGHWAY
BALTIMORE, MARYLAND 21224

Martin W. Walsh, Jr.
Secretary

[ ] Construction Permit   [X] Operating Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. 12-0082-2-0016   Date Issued November 1, 1989

PERMIT FEE NONE   Expiration Date October 31, 1990

LEGAL OWNER & ADDRESS	SITE
Commander, Aberdeen Proving Ground Aberdeen Proving Ground, MD 21005-5131 ATTN: STEAP-SH-EE Donald Green Bldg. E-4430	Building E-3081 Edgewood Area Harford County

INSTALLATION DESCRIPTION

Burn-Zol Model 272 infectious waste incinerator rated at 375 lbs./hr.

Sixty (60) days prior to expiration date of this permit an application for a permit to operate shall be resubmitted.

Program Administrator   Director, Air Management Administration

(NOT TRANSFERABLE)

AMA-1 (Rev. 1-22-88)

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STATE OF MARYL_D - DEPARTMENT OF HEALTH AND _ITAL HYGIENE

Office of Environmental Programs

Air Management Administration

P.O. Box 13387

Baltimore, Maryland 21203

RECEIVED

OCT 18

AIR MANAGEMENT ADMINISTRATION

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

. PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD — BLDG E-3081

PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander, USAAPGSA, ATTN: STEAP-SH-E

Aberdeen Proving Ground, MD 21005-5001 — Harford

PREMISE ADDRESS — COUNTY

I. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, BURN-ZOL	375	2 0016 80
2	Model #272 incinerator		

II. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal parts/animal bedding
2		

DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
	After burner with barometric damper	.051gr/DSCF
2		

☐ Yes ☐ No ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ____________

Date

____

SIGNATURE AND TITLE

____

DATE

IA-27 April 1, 1973

DO NOT WRITE BELOW THIS LINE

FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Laramie Daniel	10-12-89	Donald Green

DISCUSSION, CONDITIONS AND RECOMMENDATION:

Inspection of the Burn-Zol model 272 infectious waste incinerator. Unit was preheated at the time of arrival. Incinerator was charged with approximately 80 pounds of waste consisting of animal bedding (sawdust) and animal wastes for the purpose of the inspection. A visible emissions test was conducted and there were no smoke emissions present during the test observation. The unit was operating with temperatures of 1200°F in the primary chamber and 1700°F in the upper chamber. No problems noted.

There were no changes in operation during the past year. The incinerator is in operation five days per week burning about 2400 pounds of waste per day. The infectious waste from Kirk Army Medical Cneter is burned in this incinerator since the Medical Center's incinerator is inoperable. No major repair work was needed during the past year, only routine maintenance.

There were no complains received and no violations noted during the past year. Recommend that the annual Permit to Operate be issued.

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT

Air Management Administration
O'Conor Building
201 West Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 10-12-89

Time At Start Of Observation 11:24AM

Premise Name APG-Edgewood Area

Address Bldg. E-3081

County Harford

Type of Installation infectious waste incinerator

Color of Plume ——

Point of Discharge incinerator stack

Steam Plume [X] None [ ] Attached [ ] Detached

Point of Observation NE of stack

Sky Conditions clear

Ambient Temperature 68°F

Wind Direction SE

Wind Speed 5 mph

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
0	0	0	0	0	20					40				
1	0	0	0	0	21					41				
2	0	0	0	0	22					42				
3	0	0	0	0	23					43				
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19					39					59				

Remarks: pre heated at arrival, charged with 80 lbs of animal bedding, operating temps. primary 1200°F upper 1700°F No problems noted. Emissions in compliance.

Name of Observer: Laramie Daniel

AMA-19 Revised 10-1-81
DENV 137

STATE OF MARYLAND · DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Office of Environmental Programs
Air Management Administration
P.O. Box 13387
Baltimore, Maryland 21203

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD — Bldg E-3081
PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander, APG, STEAP-FE-M, Env Mgmt Ofc
Aberdeen Proving Ground, MD 21005-5001 — Harford
PREMISE ADDRESS ATTN: Ms. C. Couch — COUNTY

I. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, BURN-ZOL	375	2 0016 80
2	Model #272 incinerator		

AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal parts/animal bedding
2		

DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
	After burner with barometric damper	.051gr/DSCF

☒ Yes ☐ No — ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ______ Date

RECEIVED
SEP 21 1987
AIR MANAGEMENT
ADMINISTRATION

KENNETH P. STACHIW
SIGNATURE AND TITLE
Installation Environmental
Quality Coordinator

DATE

-27 April 1, 1973 — DHMH 78

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POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF THE ENVIRONMENT

2500 BROENING HIGHWAY 201 W. PRESTON STREET
BALTIMORE, MARYLAND 21202 24

Martin W. Walsh, Jr.
Secretary

[ ] Construction Permit   [X] Operating Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. 12-0082-2-0016   Date Issued November 1, 1988

PERMIT FEE NONE   Expiration Date October 31, 1989

LEGAL OWNER & ADDRESS	SITE
Commander, Aberdeen Proving Ground STEAP-SH-E APG(EA), Maryland 21010-5423 ATTN: Rosemary Austin Bldg. E-4430	Building E-3081 Edgewood Area Harford County

INSTALLATION DESCRIPTION

Burn-Zol Model 272 infectious waste incinerator rated at 375 lbs./hr.

Sixty (60) days prior to expiration date of this permit an application for a permit to operate shall be resubmitted.

Administrator, Engineering and Enforcement Program

George P. Ferreri
Director, Air Management Administration

(NOT TRANSFERABLE)

SAW 12/2/88

AMA-1 (Rev. 1-22-88)

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STATE OF MARYLAND - DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Office of Environmental Programs
Air Management Administration
P.O. Box 13387
Baltimore, Maryland 21203

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

I. PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD — Bldg E-3081
PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander, USAAPGSA, ATTN: STEAP-SH-E
Aberdeen Proving Ground, MD 21005-5001 — Harford
PREMISE ADDRESS — COUNTY

II. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, BURN-ZOL	375	2 0016 80
2	Model #272 incinerator		

III. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal parts/animal bedding
2		

DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
	After burner with barometric damper	.051gr/DSCF
2		

☐ Yes ☐ No ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ____________
Date

JOHN F. ROTH John Roth
SIGNATURE AND TITLE
Director of Safety, Health, and Environment

6 Oct 88
DATE

JA-27 April 1, 1973

DO NOT WRITE BELOW THIS LINE

FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Laramie Rude JR Carl Rivkin	November 9, 1988	Rosemary Austin

DISCUSSION, CONDITIONS AND RECOMMENDATION:

Inspection of the Burn-Zol model 272 infectious waste incinerator. Unit was in operation at time of arrival burning animal and animal parts without visible emissions from the incinerator stack. Unit was charged with 100 lbs. of waste consisting of corn cobs, saw dust and animal waste for the purpose of the inspection. Conducted a visible emissions test. No smoke emissions were present during the test observation. The incinerator was operating with temperatures of 1800°F in the upper chamber and 1200°F in the main chamber. The temperature gauges were out of adjustment. The gauges are to be checked and repaired so that accurate temperature readings can be obtained. No other problems noted.

There were no changes in operation during the past year. The incinerator had some repair work done on its transformer recently. There were no complaints received and no violations noted during the past year.

Recommend that the annual permit to operate be issued.

ARW

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT

Air Management Administration
O'Conor Building
201 West Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 11-9-88

Time At Start Of Observation 10:35AM

Premise Name APG

Address Edgewood - Bldg.-E3081 County Harford

Type of Installation infectious waste incinerator Color of Plume ——

Point of Discharge incinerator stack

Steam Plume [X] None [ ] Attached [ ] Detached

Point of Observation E of stack

Sky Conditions Clear Ambient Temperature 55-60°F

Wind Direction NW Wind Speed 8-10mph

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
0	0	0	0	0	20					40				
1	0	0	0	0	21					41				
2	0	0	0	0	22					42				
3	0	0	0	0	23					43				
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5	0	0	0	0	25					45				
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19					39					59				

Remarks: Unit in operation at time of arrival. Charged with 100 lbs. (corn cobs, saw dust, animal parts) operating temps -1800°F upper chamber, 1200°F main chamber. Recommend that the annual permit to operate be issued. Temperature gauges need repair to get readings.

Name of Observer Loraine Rude
E-21

MA-19 Revised 10-1-81

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FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Laramie Rude	October 15, 1987	Cindy Couch Charles Marll Clarence Tittle

DISCUSSION, CONDITIONS AND RECOMMENDATION:

Inspection of the Burn-Zol Model 272 infectious waste incinerator. Unit was in operation at time of arrival burning without visible emissions. Unit was recharged with 17 lbs. of waste consisting of animal bedding. Conducted a visible emission test on stack and no smoke emissions were visible. Incinerator was burning with temperatures of 900°F in the main chamber and 1675°F in the upper chamber. No problems noted.

There are no changes in operation over the past year. No complaints or violations noted during the past year. Recommend that the annual permit to operate be issued.

POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
201 W. PRESTON STREET
BALTIMORE, MARYLAND 21201

Martin W. Walsh Jr.
Secretary

William M. Eichbaum
Assistant Secretary for Environmental Programs

☐ Construction Permit ☒ Operating Permit ☐ DHS Facility Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. 12-0082-2-0016

Date Issued November 1, 1987

PERMIT FEE NONE

Expiration Date October 31, 1988

LEGAL OWNER & ADDRESS	SITE
Commander, APG STEAP-FE-M, Env. Mgt. Ofc. Aberdeen Proving Ground, MD 21005-5001 ATTN: Ms. Cindy Couch	Building E-3081 Edgewood Area Harford County

INSTALLATION DESCRIPTION

Burn-Zol Model 272 infectious waste incinerator rated at 375 lbs/hr.

Sixty (60) days prior to expiration date of this permit an application for a permit to operate shall be resubmitted.

Administrator, Engineering and Enforcement Program

George P. Ferreri
Director, Air Management Administration

REC 10/30/87 (NOT TRANSFERABLE) LRW 10/26/87

1 (Rev. 2-1-78) DHMH 1569

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STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT

Air Management Administration
O'Conor Building
201 W. Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 10-15-87

Time At Start Of Observation 10:44AM

Premise Name APG- Edgewood. Area

Address Bldg. E-3081 County Harford

Type of Installation infectious waste incinerator Color of Plume none

Point of Discharge stack

Steam Plume [X] None [ ] Attached [ ] Detached

Point of Observation S of stack

Sky Conditions clear Ambient Temperature 55°F

Wind Direction SW Wind Speed 5mph

Sec / Min	0	15	30	45	Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
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19					39					59				

Remarks: unit in operation at time of arrival, burning animal bedding, re-charged with 17 lbs. of waste during inspection. [illegible]ating temps: 900°F main chamber 1675°F - upper chamber. Emissions in compliance. Recommend P/O be issued.

Name of Observer Laranie Rude

MA-19 Revised 10-1-81
DENV 137

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POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
201 W. PRESTON STREET
BALTIMORE, MARYLAND 21201

Adele Wilzack, R.N., M.S.
Secretary

William M. Eichbaum
Assistant Secretary for Environmental Programs

[ ] Construction Permit [X] Operating Permit [ ] DHS Facility Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. 12-0082-2-0016

Date Issued November 1, 1986

PERMIT FEE None

Expiration Date October 31, 1987

LEGAL OWNER & ADDRESS	SITE
Commander, APG STEAP-FE-M, Env. Mgt. Ofc. Aberdeen Proving Ground, MD 21005-5001 Attn: David Parks	Building E-3081 Edgewood Area Harford County

INSTALLATION DESCRIPTION

Burn-Zol model 272 infectious waste incinerator rated at: 375 lbs/hr.

Sixty days prior to expiration date of this permit an application for a permit to operate shall be resubmitted.

Donald P. Andrews[signature]
Administrator, Engineering and Enforcement Program

George P. Ferreri[signature]
Director, Air Management Administration

(NOT TRANSFERABLE)

MA-1 (Rev. 2-1-79) DHMH 1500

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STATE OF MARYLAND · DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Office of Environmental Programs
Air Management Administration
P.O. Box 13387
Baltimore, Maryland 21203

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

I. PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD — Bldg E-3081
PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander APG, STEAP-FE-M, Env Mgt Ofc
Aberdeen Proving Ground, MD 21005 — Harford
PREMISE ADDRESS ATTN: Mr. D. Parks — COUNTY

II. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, BURN-ZOL Model #272 indinerator	375	2 0016 80

III. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal parts
2		

DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
1	After burner with barometric damper	.051gr/DSCF
2		

[X] Yes [ ] No ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ____________
Date

RECEIVED
SEP 24 1986
AIR MANAGEMENT ADMINISTRATION

Acting for KENNETH P. STACHIW
Installation Environmental Quality Coordinator
SIGNATURE AND TITLE

22 Sep 86
DATE

C-27 April 1, 1973

FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Laramie Rude LR	October 14, 1986	David Parks Charles Marll Clarence Tittle

DISCUSSION, CONDITIONS AND RECOMMENDATION:

Inspection of the Burn-Zol model 272 infectious waste incinerator. Unit was in operation at arrival time, burning without smoke emissions. Incinerator was charged with 45-50 lbs. of waste consisting of animal bedding and animal waste. Conducted a visible emission test. No smoke emissions present. Unit was burning with temperatures of 1000°F in the primary chamber and 1000°F in the secondary chamber. No problems noted.

There have been no changes in operation during the past year. Future plans are being considered for raising the incinerator stack height. There were no complaints or violations during the past year.

Recommend that the annual permit to operate be issued.

Law

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
Air Management Administration
O'Conor Building
201 W. Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 10-14-86

Time At Start Of Observation 1:45PM

nise Name APG-Edgewood

ress Bldg. E-3081 County Harford

of Installation infectious waste incinerator Color of Plume None

nt of Discharge incinerator stack Steam Plume ☒ None ☐ Attached ☐ Detached

nt of Observation SE of stack

onditions partly cloudy Ambient Temperature 72°F

d Direction SW Wind Speed 5mph

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
0	0	0	0	0	20					40				
1	0	0	0	0	21					41				
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19					39					59				

arks: Unit in operation at time of arrival.
Charged with 45-50 lbs. waste
Recommend P/O be issued.

Name of Observer Laramie Rude

1841
Revised 10-1-81

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POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
201 W. PRESTON STREET
BALTIMORE, MARYLAND 21201

Adele Wilzack, R.N., M.S.
Secretary

William M. Eichbaum
Assistant Secretary for
Environmental Programs

[ ] Construction Permit [X] Operating Permit [ ] DHS Facility Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. 12-0082-2-0016

Date Issued November 1, 1985

PERMIT FEE None

Expiration Date October 31, 1986

LEGAL OWNER & ADDRESS

Commander, APG
STEAP-FE-M, Env. Mgt. Ofc.
Aberdeen Proving Ground, Maryland
21005-5001
Attn: Tim McNamara

SITE

Building E-3081
Edgewood Area
Harford County

INSTALLATION DESCRIPTION

Burn-Zol model 272 infectious waste incinerator rated at 375 lbs/hr.

Sixty days prior to expiration date of this permit an application for a permit to operate shall be resubmitted.

Administrator, Engineering and Enforcement Program

George P. Ferreri
Director, Air Management Administration

REZ (NOT TRANSFERABLE)
10/21/85
ADW 10/21/85

AMA-1 (Rev. 2-1-79) DHMH 1669

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STATE OF MAR AND · DEPARTMENT OF HEALTH AN IENTAL HYGIENE
Office of Environmental Programs
Air Management Administration
P.O. Box 13387
Baltimore, Maryland 21203

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

I. PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD Bldg F-3081 — 17-0082

PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander, APG, STEAP-FE-M, Env Mgt Ofc, ATTN:
Tim McNamara, Aberdeen Proving Ground, MD 21005-5001 — Harford

PREMISE ADDRESS — COUNTY

II. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, Burn - Zol, Model ~~#272 incinerator~~	375	2-0016-80
2			

III. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal waste
2		

IV. DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
1	After burner with barometric damper	.051 gr/DSCF
2		

V. [X] Yes [ ] No ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ____________
Date

RECEIVED
SEP 18 1985
AIR MANAGEMENT ADMINISTRATION

KENNETH P. STACHIW
Instl Env Qual Coord
Kenneth P. Stachiw
SIGNATURE AND TITLE

16 AUG 1985
DATE

QC-27 April 1, 1973

DO NOT WRITE BELOW THIS LINE

FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Laramie Rude	October 1, 1985	Jim Pottie William Greene

DISCUSSION, CONDITIONS AND RECOMMENDATION:

Inspection of the Burn-Zol model 272 infectious waste incinerator. Unit was in operation at time of arrival, burning waste consisting of animal bedding and animal wastes. Conducted visible emission test; unit in compliance. No problems noted. There have been no complaints or violations during the past year. Recommend that the annual permit to operate be issued.

Lew

MARYLAN_ _TATE DEPARTMENT OF HEALTH AND M_ AL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
Air Management Administration
O'Conor Building
201 W. Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 10-1-85

Time At Start Of Observation 10:58AM

emise Name APG- Edgewood Arsenal

dress Bldg. E-3081 County Harford

pe of Installation infectious waste incinerator Color of Plume —

int of Discharge stack

int of Observation SE of stack

Steam Plume ☒ None ☐ Attached ☐ Detached

v Conditions clear - some haze Ambient Temperature 70°F

nd Direction N Wind Speed 5-10 mph

Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45	Min \ Sec	0	15	30	45
0	0	0	0	0	20					40				
1	0	0	0	0	21					41				
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18					38					58				
19					39					59				

arks: Unit in operation upon arrival, burning animal bedding. No smoke emissions. Unit is compliance.

Name of Observer Laramie Rude

1841
9 Revised 5-1-81

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POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
201 W. PRESTON STREET
BALTIMORE, MARYLAND 21201

Adele Wilzack, R.N., M.S.
Secretary

William M. Eichbaum
Assistant Secretary for Environmental Programs

[ ] Construction Permit [X] Operating Permit [ ] DHS Facility Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. 12-0082-2-0016

Date Issued November 1, 1984

PERMIT FEE None

Expiration Date October 31, 1985

LEGAL OWNER & ADDRESS	SITE
Aberdeen Proving Ground Aberdeen, Maryland 21005 Attn: STEAP-PE-M Mr. Joseph P. Ondek	Building E-3081 Edgewood Area Harford County

INSTALLATION DESCRIPTION

Burn-Zol model 272 infectious waste incinerator rated at 375 lbs/hr.

Sixty days prior to expiration date of this permit an application for a permit to operate shall be resubmitted.

Donald P. Andrews
Administrator, Engineering and Enforcement Program

George P. Ferreri
Director, Air Management Administration

REZ 10/5/84 (NOT TRANSFERABLE) [illegible] 10/5/84

MA-1 (Rev. 2-1-79) DHMH 1589

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STATE OF MARYL__D · DEPARTMENT OF HEALTH AND __NTAL HYGIENE
Office of Environmental Programs
Air Management Administration
P.O. Box 13387
Baltimore, Maryland 21203

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

I. PREMISE IDENTIFICATION:

12-0082

Pathological Waste Incinerator, USAHRICD — Bldg E-3081
PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander, APG, STEAP-FE-M, Env Mgt Ofc, ATTN: Joe Ondek, Aberdeen Proving Ground, MD 21005-5001 — Harford
PREMISE ADDRESS — COUNTY

II. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, Burn - Zol, Model #272 incinerator	375	2-0016-80
2			

III. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal waste
2		

IV. DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
1	After burner with barometric damper	.051 gr/DSCF
2		

V. ☒ XX Yes ☐ No ON-SITE TESTS PERFORMED

UNIT TO BE TESTED ______________
Date

KENNETH P. STACHIW Kenneth P. Stachiw
~~Instl Env Qual Coord~~
SIGNATURE AND TITLE

2 OCT 84
DATE

AQC-27 April 1, 1973

DO NOT WRITE BELOW THIS LINE

FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Laramie Rude, AMA LR Thomas Thomas, Harford Co. Tom Kusterer, Harford Co. Larry Webber, Harford Co.	10-2-84	Tim McNamara

DISCUSSION, CONDITIONS AND RECOMMENDATION:

Inspection of Burn-Zol Model 272 infectious waste incinerator. Unit was in operation upon arrival, operating without visible emissions. Unit was recharged with 200 lbs. of waste consisting of guinea pigs. Unit was operating at temperature of 1100°F in primary chamber. Conducted visible emission test; unit in compliance. No problem noted. There have been no complaints or violations during the past year.

Recommend that the annual permit to operate be issued.

Jw

MARYLAND S__E DEPARTMENT OF HEALTH AND MENT__ HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
Air Management Administration
O'Conor Building
201 W. Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 10-2-84

Time At Start Of Observation 11:28AM

emise Name APG-Edgewood Arsenal Bldg. E-3081

dress Edgewood. County Hartford

pe of Installation infectious waste incinerator Color of Plume none

int of Discharge incinerator stack

int of Observation SE of stack 50ft

Steam Plume ☒ None ☐ Attached ☐ Detached

Conditions partly cloudy Ambient Temperature 60° F

d Direction NW Wind Speed 12 mph

Sec / in	0	15	30	45	Sec / Min	0	15	30	45	Sec / Min	0	15	30	45
0	0	0	0	0	20					40				
1	0	0	0	0	21					41				
2	0	0	0	0	22					42				
3	0	0	0	0	23					43				
4	0	0	0	0	24					44				
5	0	0	0	0	25					45				
6	0	0	0	0	26					46				
7	0	0	0	0	27					47				
8	0	0	0	0	28					48				
9	0	0	0	0	29					49				
10	0	0	0	0	30					50				
11	0	0	0	0	31					51				
12	0	0	0	0	32					52				
13	0	0	0	0	33					53				
14	0	0	0	0	34					54				
15	0	0	0	0	35					55				
16	0	0	0	0	36					56				
17	0	0	0	0	37					57				
18	0				38					58				
19					39					59				

ks: unit charged with 200 lbs waste
emissions in compliance

Name of Observer Laramie Rude

vised 10-1-81

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STATE OF MARYL D - DEPARTMENT OF HEALTH ANL ENTAL HYGIENE

OFFICE OF ENVIRONMENTAL PROGRAMS
Air Management Administration
201 W. Preston Street
Baltimore, Maryland 21201

APPLICATION FOR PERMIT TO OPERATE INCINERATORS

PREMISE IDENTIFICATION:

Pathological Waste Incinerator, USAMRICD — Bldg E-3081
PREMISE NAME OR IDENTIFICATION — PREMISE NUMBER

Commander APG, STEAP-PE-M, Env Mgt Ofc
Aberdeen Proving Ground, MD 21005 — Harford
PREMISE ADDRESS ATTN: Mr. Joe Ondek — COUNTY

II. EQUIPMENT IDENTIFICATION:

UNIT	TYPE EQUIPMENT (By-product waste, municipal, etc.)	LBS/HR (Design)	REGISTRATION NO.
1	3-chambered, oil fired, BURN-ZOL Model #272 indinerator	375	2 0016 80
2			

III. AMOUNT AND DESCRIPTION OF WASTE BEING INCINERATED:

UNIT	AMOUNT (Tons/Year)	DESCRIPTION OF WASTE
1	312	Pathological waste/animal parts
2		

IV. DESCRIPTION OF AIR POLLUTION CONTROL DEVICE

UNIT	TYPE CONTROL DEVICE	GRAIN LOADING (at 12% CO_2)
1	After burner with barometric damper	.051gr/DSCF
2		

V. [X] Yes [ ] No ON-SITE TESTS PERFORMED

Enclosed is a copy of the stationary source assessment for the incinerator at building E-3081, dated 26-28 Sept 83

UNIT TO BE TESTED ______ Date

RECEIVED

NOV 22 1983

AIR MANAGEMENT ADMINISTRATION

KENNETH P. STACHIW Kenneth P. Stachiw
Installation Environmental Quality Coordinator
SIGNATURE AND TITLE

18 November 1983
DATE

FIELD REPORT

INSPECTOR:	DATE OF INSPECTION:	PERSON CONTACTED:
Justin Hsu Melvin T. Joye	07/22/83 08/01/83 09/27/83	Joseph Ondeck

DISCUSSION, CONDITIONS AND RECOMMENDATION:

Made inspections of Burn Zol 07/22/83 and 08/01/83. No visible emission.

Stack test performed 9/28/83 and 9/29/83. Justin Hsu and Bill Paul attended stack test on 9/28. Results are included with this application.

Recommend permit to operate be issued for this incinerator.

M.T.J.
JHsu

POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
201 W. PRESTON STREET
BALTIMORE, MARYLAND 21201

Adele Wilzack R.N., M.S.
~~Charles R. Buck Jr. Sc.D.~~
Secretary

William M. Eichbaum
Assistant Secretary for
Environmental Programs

[ ] Construction Permit   [X] Operating Permit   [ ] DHS Facility Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. L-00062-2-0016

Date Issued November 1, 1983

PERMIT FEE None

Expiration Date October 31, 1984

LEGAL OWNER & ADDRESS	SITE
Aberdeen Proving Ground Aberdeen, Maryland 21005 Attn: STEAP-FE-M Mr. Joseph P. Ondek	Building E-3031 Edgewood Area Harford County

INSTALLATION DESCRIPTION

Burn-Zol model 272 infectios waste incinerator rated at 375 lbs/hr.

This permit is issued with the provision that infectious waste is segregated and disposed of consistent with the Department's Interpretive Guidelines effective May 1, 1980, and emissions are within air quality requirements.

Sixty days prior to expiration date of this permit an application for a permit to operate shall be resubmitted.

Donald P. Andrews
Administrator, Engineering and Enforcement Program

George P. Ferreri
Director, Air Management Administration

RPZ 12/6/83

(NOT TRANSFERABLE)

12-5-83

AMA-1 (Rev. 2-1-79) DHMH 1589

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ice of Environmental Programs
Air Management Administration
201 W. Preston Street
Baltimore, Maryland 21201

REPORT IN CHANGE OF STATUS OR OWNERSHIP FOR REGISTERED EQUIPMENT

1. 1 2 County — 0 0 8 2 Premises Number — Aberdeen Proving Ground Premises Name — 3-28-84 Today's Date

Bldg. E2338 Edgewood Area Premises Address (Street) — APG (City or Town) — 21005 (Zip Code)

2 Existing Registration No. 0 0 1 3 — ☐ New Registration No. ☐☐☐☐ — New Forms Required? Yes ☐ No ☒

2. Change in Status as of 3-23-84 (date):

- ☐ Change in Ownership or Name
- ☐ Relocation or Temporarily Out of Use
- ☒ Out of Business or Shutdown
- ☐ Informational Change
- ☐ Other ______

3. Change in Emissions as of ______ (date):

- ☐ New Equipment Construction
- ☐ New Control Device Installation
- ☐ Replacement
- ☐ Equipment Modification
- ☐ Change in Emission Factors
- ☐ Change in Operation

4. Change in Status ______ New Owner and/or Name

______ New Address (Street) (City or Town) (Zip Code)

5. Change in Actual Emissions in Pounds Per Operating Day

	Current Estimate	Applicable Mo., Yr.	New Estimate	Applicable Mo., Yr.
TSP				
SO_2				
CO				
NOx				
VOC				

6. Comments Incinerator is not operational. Permit to operate will not be re-issued.

E-41

DHMH 1364

Signature Laramie Rude

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'ice of Environmental Programs
Air Management Administration
201 W. Preston Street
Baltimore, Maryland 21201

REPORT IN CHANGE OF STATUS OR OWNERSHIP FOR REGISTERED EQUIPMENT

1 2 County | 0 0 8 2 Premises Number | Aberdeen Proving Ground Premises Name | 3-28-84 Today's Date

Bldg. E-3948 Edgewood Area Premises Address (Street) | Aberdeen (City or Town) | 21005 (Zip Code)

2 0 0 1 5 Existing Registration No. | ☐ ☐☐☐☐ New Registration No. | Yes ☐ No ☒ New Forms Required?

Change in Status as of ____________ (date):

- ☐ Change in Ownership or Name
- ☐ Relocation or Temporarily Out of Use
- ☐ Out of Business or Shutdown
- ☐ Informational Change
- ☐ Other ____________

3. Change in Emissions as of ____________ (date):

- ☐ New Equipment Construction
- ☐ New Control Device Installation
- ☐ Replacement
- ☐ Equipment Modification
- ☐ Change in Emission Factors
- ☐ Change in Operation

Change in Status ____________
New Owner and/or Name

____
New Address (Street) (City or Town) (Zip Code)

Change in Actual Emissions in Pounds Per Operating Day

	Current Estimate	Applicable Mo., Yr.	New Estimate	Applicable Mo., Yr.
TSP				
SO_2				
CO				
NOx				
VOC				

Comments No change in Emission Factors

E-42
Signature Laramie Rude

MH 1364

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Maryland State Department of Health and Mental Hygiene
Office of Environmental Programs
Air Management Administration
201 W. Preston Street
Baltimore, Maryland 21201

REPORT IN CHANGE OF STATUS OR OWNERSHIP FOR REGISTERED EQUIPMENT

1. County: 1 2 — Premises Number: 0 0 8 2 — Premises Name: Aberdeen Proving Ground — Today's Date: 3-28-84

Premises Address (Street): Bldg. E 3226, Edgewood Area — (City or Town): APG — (Zip Code): 21005

Existing Registration No.: 2 0 0 1 1 — New Registration No.: ☐ ☐☐☐☐ — New Forms Required? Yes ☐ No ☒

2. Change in Status as of 3-23-84 (date):

- ☐ Change in Ownership or Name
- ☐ Relocation or Temporarily Out of Use
- ☒ Out of Business or Shutdown
- ☐ Informational Change
- ☐ Other ______

3. Change in Emissions as of ______ (date):

- ☐ New Equipment Construction
- ☐ New Control Device Installation
- ☐ Replacement
- ☐ Equipment Modification
- ☐ Change in Emission Factors
- ☐ Change in Operation

4. Change in Status ______ New Owner and/or Name

______ New Address (Street) ______ (City or Town) ______ (Zip Code)

5. Change in Actual Emissions in Pounds Per Operating Day

	Current Estimate	Applicable Mo., Yr.	New Estimate	Applicable Mo., Yr.
TSP				
SO_2				
CO				
NOx				
VOC				

6. Comments: Incinerator is not operational. Permit to operate will not be issued (renewed).

Signature: Laramie Rude

DHMH 1364
AMA-21 Revised 1/3/83

E-43

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POST IN CONSPICUOUS PLACE

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
201 W. PRESTON STREET
BALTIMORE, MARYLAND 21201

Charles R. Buck, Jr., Sc.D.
Secretary

William M. Eichbaum
Assistant Secretary for Environmental Programs

[ ] Construction Permit [X] Temporary Operating Permit [ ] DHS Facility Permit

AIR MANAGEMENT ADMINISTRATION

PERMIT NO. L-[illegible]82-2-0016

Date Issued May 24, 1982

PERMIT FEE None

Expiration Date August 24, 1982

LEGAL OWNER & ADDRESS	SITE
Aberdeen Proving Ground Aberdeen, Maryland 21005 Attn: STEAP-PE-M, Mr. Joseph P. Ondek	Bldg. E-3081 Edgewood Area Harford County

INSTALLATION DESCRIPTION

Burn-Zol model 272 infectious waste incinerator rated at 375 lbs/hr.

This permit is issued with the proviso that infectious waste is segregated and disposed of consistent with the Department's Interpretive Guidelines effective May 1, 1980, and emissions are within air quality requirements.

This permit serves as a start-up permit. The Company shall use the period granted to solve operational problems and demonstrate compliance with all applicable air pollution control regulations. Compliance must be achieved before an annual permit to operate is issued.

George P. Ferreri
Director, Air Management Administration

Will M. Eichbaum
Assistant Secretary for Environmental Programs

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APPENDIX F

AMERICAN ASSOCIATION OR ACCREDITATION OF LABORATORY ANIMAL CARE CERTIFICATE

American Association
FOR
Accreditation of Laboratory Animal Care

U.S. Army Medical Research
Institute of Chemical Defense
Aberdeen Proving Ground, MD

Is hereby accredited for demonstrating its compliance with the Association's standards.

[illegible]

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American Association for Accreditation
of Laboratory Animal Care
9650 Rockville Pike
Bethesda, Maryland 20814-3998
(301) 571-1850

November 7, 1989

James E. Hall, D.V.M..
Chief, Veterinary Medicine &
Laboratory Resources Support Div.
U.S. Army Medical Research
Institute of Chemical Defense
Aberdeen Proving Ground, MD 21010-5425

Dear Dr. Hall:

The Council on Accreditation of the American Association for Accreditation of Laboratory Animal Care has renewed the report of the recent site visit to the United States Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, Maryland. Council several aspects of the animal care and use program The level of animal care provided by the animal care staff and the preventative medicine programs were noteworthy. Council was impressed by the in-depth protocol review process and by the institutional commitment to training investigators and technicians. The Council is pleased to inform you that the program complies with AAALAC standards as set forth by the Guide for the Care and Use of Laboratory Animals (Guide), DHHS Pub. No. ((NIH)) 85-23, Revised 1985. Therefore, FULL accreditation shall continue.

Council acknowledges receipt of Col. Dunn's letter of October 27, 1989 conveying action initiated relative to the site visitors' comments during the exit briefing. Specifically the items included: nonhuman primate cage sanitation frequency; use of sterile instruments and aseptic techniques for rodent survival surgery, animal feed storage; rabbit pan sanitation tape and residues on equipment; storage of unnecessary equipment in animal rooms; vermin control; and an unsealed wall juncture and minor damage to wall and floors.

While Council is pleased to continue Full Accreditation, it did note additional areas in need of improvement and offers the following suggestions for improvement:

1. Two rabbits in Room 153 in Building E -3081 had a large number (20 to 30) of ulcerated injection sites on their backs. The approved protocol for this study indicated that Complete Freund's Adjuvant (CFA) was to be used with no stipulation on reuse. One of the investigators involved in the study stated that CFA was used for secondary injections.

The use of Complete Freund's Adjuvant is scientifically recognized as an effective means of potentiating humoral antibody response. However, use and especially reuse of this agent is associated with the formation of sterile abscesses, granuloma formation, and significant discomfort to the animals. Undesirable and painful side effects of large inflammatory lesions or tissue necrosis can usually be effectively reduced or eliminated by adequate separation of injection sites and the use of small amounts of inoculum per site. Further CFA is usually only necessary for the initial immunizations; incomplete Freund's Adjuvant is recommended for subsequent immunizations. Non-inflammatory adjuvants known to produce less intensive inflammatory responses should be considered when deemed capable of eliciting a humoral response.

The criteria for selecting immunizing adjuvants and methods for their administration to animals should be carefully reviewed and revised to assure responsible care in avoiding or minimizing the adverse effects of excessive inflammation, pain and distress.

2. Room 155 in Building E-3081 contained one rack of rabbits and nine racks of mouse cages. Approximately half of the mouse racks were dirty and the other half appeared clean. Council understands that the mouse racks in the room allowed technicians to move mice in and out of the room for observation. The storage of dirty cages with clean cages provides potential for spread of contaminants. This procedure should be reevaluated.

AAALAC requires an annual report detailing changes made during the year in fully accredited units. The Council requests an update of any corrective measures taken in response to these suggestions when we call for your report.

Sincerely,

John B. Mulder, D.V.M.
Chairman
Council on Accreditation

JBM:ksd
615

cc: Col. Michael A. Dunn, Commanding Officer

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APPENDIX G

PLANT AND ANIMAL SPECIES RECORDED
E ROM ABERDEEN PROVING GROUND, MARYLAND

APPENDIX G

Tree Species at Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resources Management Plan, 1987)

Botanical Name	Common Name	Occurrence
Acer nugundo	Box Elder	Scarce
Acer rubrun	Red Maple	Common
Acer saccharinum	Silver Maple	Common
Acer saccahrum	Sugar Maple	Scarce
Aseculus octandra	Sweet Buckeye	Scarce
Ailanthus altissima	Tree of Heaven	Uncommon
Aralia spinosa	Hercules Club	Scarce
Betula nigra	River Birch	Uncommon
Cercis canadensis	Redbud	Uncommon
Carya cordiformis	Bitternut	Uncommon
Carya glabra	Sweet Pignut	Uncommon
Carya tomentosa	Mockernut	Uncommon
Castanea dentate	American Chestnut	Uncommon
Celtis occidentalis	Hackberry	Uncommon
Cornus florida	Flowering Dogwood	Common
Diospyros virginiana	Persimmon	Common
Fagus grandifolia	American Beech	Locally common
Fraxinus americana	White Ash	Uncommon
Fraxinus pennsylvanica		
var. pennsylvanica	Red Ash	Common
var. subintegerrima	Green Ash	Common
Ginkgo biloba	Maidenhair Tree	Scarce
Gymnocladus dioica	Kentucky Coffee Tree	Scarce
Ilex opaca	American Holly	Common
Juglans cinerea	Butternut	Uncommon
Juglans nigra	Black Walnut	Uncommon
Juniperus virginiana	Red Cedar	Common

Liquidambar styraciflua	Sweet Gum	Abundant
Liriodendron tulipifera	Yellow Poplar	Abundant

Tree Species at Aberdeen Proving Ground, Maryland
(Continued)

Botanical Name	Common Name	Occurrence
Magnolia acuminate	Cucumber Tree	Scarce
Metasequoia glyptostroboides	Dawn Redwood	Scarce
Morus alba	White Mulberry	Uncommon
Nyssa sylvatica	Sour Gum	Common
Paulownia tomentosa	Empress Tree	Uncommon
Picea abies	Norway Spruce	Scarce
Pinus rigida	Pitch Pine	Uncommon
Pinus virginiana	Scrub Pine	Uncommon
Platanus occidentalis	Sycamore	Common
Polulus grandidentata	Big-toothed Aspen	Uncommon
Prunus serotina	Wild Cherry	Abundant
Pyrus communis	Pear	Scarce
Pyrus malus	Apple	Scarce
Pyrus sp.	Crab apple	Scarce
Quercus alba	White Oak	Uncommon
Quercus borealis	Red Oak	Uncommon
Quercus coccinea	Scarlet Oak	Uncommon
Quercus falcata	Southern Red Oak	Common
Quercus palustris	Pin Oak	Common
Quercus phellos	Willow Oak	Abundant
Quercus prinus	Chestnut Oak	Locally common
Robinia psuedoacacia	Black Locust	Very common
Salix nigra	Black Willow	Common
Sassafras albidum	Sassafras	Common
Taxodium distichum	Bald Cypress	Infrequent
Titia sp.	Banswood	Scarce
Tsuga canadensis	Hemlock	Infrequent

Shrub Species at Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resources Management Plan, 1987)

Botanical Name	Common Name	Occurrence
Amelanchier canadensis (= Amelanchier oblongifolia)	Service Berry	Locally common
Amorpha fruticosa	False Indigo	Locally common
Asimina triloba	Pawpaw	Uncommon
Baccharis halimifolia	Groundsel Tree	Locally common
Berberis thunbergii	Japanese Barberry	Uncommon
Campsis radicans	Trumpet Creeper	Uncommon
Clethra alnifolia	Sweet Pepper Bush	Abundant
Crataegus sp.	Hawthorn	Scarce
Caylussacia baccata	Huckleberry	Common
Caylussacia frondosa	Dangleberry	Common
Hedera helix	English Ivy	Uncommon
Kalmia latifolia	Mountain Laurel	Uncommon
Ligustrum spp.	Privet	Uncommon
Ligustrum obtusifolium	Privet	Uncommon
Lindera benzoin	Spicebush	Common
Lonicera japonica	Japanese Honeysuckle	Abundant
Lyonia ligustrina	Male Berry	Uncommon
Myrica pennsylvanica	Bayberry	Uncommon
Parthenocissus quinquefolia	Virginia Creeper	Common
Rhododendron sp.	Rhododendron	Scarce
Rhus copallina	Dwarf Sumac	Uncommon
Rhus glabra	Smooth Sumac	Uncommon
Rhus radicans	Poison Ivy	Very Common
Rhus typhina	Staghorn Sumac	Uncommon

Rosa multiflora	Multiflora Rose Uncommon	
Rosa Carolina	Wild Rose	Scarce
Rubus allegheniensis	Blackberry	Common
Rubus flagellaris	Northern Dewberry	Common

Shrub Species at Aberdeen Proving Ground, Maryland
(continued)

Botanical Name	Common Name	Occurrence
Rubus occidentalis	Black Raspberry	Common
Rubus sp.	Yellow Raspberry	Scarce
Rubus phoenocolasius	Wineberry	Locally abundant
Sambucus canadensis	Common Elder	Common
Smilax hispida	Greenbrier	Common
Smilax rotundifolia	Greenbrier	Common
Vaccinium atrococcum	High-brush Blueberry	Common
Vaccinium corymbosum	Tall Blueberry	Common
Vaccinium stamineum	Deerberry	Uncommon
Vaccinium vacillans	Low Blueberry	Common
Viburnum dentatum	Toothed Arrowwood	Common
Viburnum nudum	Possum Haw	Uncommon
Viburnum prunifolium	Black Haw	Common
Vitis rupestris	San Grape	Common
Vitis labrusca	Fox Grape	Common
Vitis riparia	Riverbank Grape	Common

Vascular Cryptogam Species at Aberdeen Proving Ground, Maryland (Data taken from APG Natural Resources Management Plan, 1987)

Botanical Name	Common Name	Occurrence
Athyrium filix -femina	Lady Fern	Uncommon
Onoclea sensibilis	Sensitive Fern	Common
Osmunda cinnamomea	Cinnamon Fern	Common
Osmunda claytoniana	Interrupted Fern	Infrequent
Osmunda regalis	Royal Fern	Abundant
Selaginella apoda	Meadow Spikemoss	Scarce
Thelypteris noveboracensis	New York Fern	Common
Woodwardia areolata	Netted Chain Fern	Scarce

Grass Species at Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resources Management Plan, 1987)

Botanical Name	Common Name	Occurrence
Agropyron repens	Quack Grass	Uncommon
Agrostis alba	Red Top	Common
Ammophila breviligulata	Beach Grass	Uncommon
Andropogon scoparius	Broom	Uncommon
Andropogon virginicus	Broom Sedge	Common
Anthoxanthum odorathum	Sweet Vernal Grass	Common
Arthraxon hispidus	Makino	Abundant
Bromus inermis	Smooth Brome	Common
Bromus japonicus	Japanese Brome	Common
Bromus sterilis	Squarrosus Brome	Common
Bromus tectorum	Dawny Brome	Common
Cinna arundineceae	Wood Reedgrass	Abundant
Cynodon dactylon	Bermuda Grass	Infrequent
Danthonia spicata	Poverty Grass	Common
Giditaria ischaemum	Smooth Crab Grass	Common
Digitaria sanguinalis	Crab Grass	Common
Echinochloa crusqualli	Barnyard Grass	Common
Eleusine indica	Goose Grass	Infrequent
Elymus canadensis	Canada Wild Rye	Common
Elymus virginicus	Virginia Wild Rye	Common
Eragrostis bectinacea	Love Grass	Uncommon
Eragrostis poaeoides	Love Grass	Common
Eragrostis spectabilis	Tumble-grass	Uncommon
Festuca elatior	Meadow Fescue	Abundant
Festuca ovine	Sheep Fescue	Common, in shade
Festuca rubra	Red Fescue	Common, in shade
Glyceria septentrionalis	Eastern Manna Grass	Infrequent
Holcus lanatus	Velvet Grass	Common
Leersia virginica	White Cut Grass	Common

Grass Species at Aberdeen Proving Ground, Maryland
(continued)

Botanical Name	Common Name	Occurrence
Lolium perenne	Perennial Rye Grass	Uncommon
Microstegium vimineum	Orchard Grass	Uncommon
Muhlenbergia schreberi	Nimble Will	Infrequent
Muhlenbergia sylvatica	Woodland Muhly	Abundant
Panicum clandestinum	Deer Tongue Grass	Common
Panicum dichotomielorum	Fall Panicum	Common
Panicum rnicrocarpon	Panic Grass	Infrequent
Panicum villosissimum	Panic Grass	Common
Panicum virgatum	Switch Grass	Common
Paspalum laeve	Smooth Pasdalum	Common
Phleum pretense	Timothy	Uncommon
Phragmites communis	Reed	Abundant
Poa annua	Annual Blue Grass	Infrequent
Poa compressa	Canada Blue Grass	Common
Poa pratensis	Kentucky Blue Grass	Abundant
Setaria feberii	Nodding Foxtail	Common
Sertaria geniculata	Knotroot Bristlegrass	Infrequent
Setaria glauca	Foxtail Grass	Common
Setaria magna	Giant Foxtail	Uncommon
Setaria viridis	Green Foxtail	Common
Spartina cynosuroides	Cord Grass	Common
Triodia flava	Purple Top	Uncommon
Tripsacum dactyloides	Gama Grass	Common
Uniola laxa	Spike Grass	Uncommon

Composite Herbaceous Plant Species at Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resources Management Plan, 1987)

Botanical Name	Common Name	Occurrence
Achillea millefolium	Yarrow	Common
Ambrosia artemesiifolia	Common Ragweed	Common
Antennaria plantaginifolia	Pussy Toes	Uncommon
Arctium minus	Common Burdock	Common
Aster divaricatus	Aster	Common
Aster pilosus	Heath Aster	Common
Aster spp.	Aster	Common
Bidens fronosa	Beggar Ticks	Common
Bidens polylepis	Tickseed Sunflower	Locally Common
Bidens spp.	Beggar Ticks	Common
Carduus acanthoides	Thistle	Scarce
Chrysanthemum leucanthemum	Ox-eye Daisy	Common
Cichorium intybus	Chicory	Common
Cirsium discolor	Field Thistle	Uncommon
Conyza canadensis	Horseweek, Coltstail	Common
Erigeron spp.	Fleabane	Common
Eupatorium coelestinum	Spurge	Abundant
Eupatorium dubium	Joe-Pye Weed	Common
Eupatorium perfoliatum	Boneset or Thoroughwort	Common
Eupatorium purpureum	Boneset	Uncommon
Eupatorium rugosum	White Snakeroot	Common
Gnaphilum purpurea	Purple Cudweed	Uncommon
Hieracium venosum	Rattlesnake-weed	Uncommon
Krigia sp.	Dwarf Dandelion	Uncommon
Lactuca sp.	Lettuce	Abundant
Lactuca scariola	Prickly Lettuce	Uncommon
Mikania scandens	Climbing Hempweed	Scarce
Rudbeckia hirta	Black-eyed Susan	Common
Solidago caesia	Blue-stem Goldenrod	Common

Composite Herbaceous Plant Species at Aberdeen Proving Ground, Maryland
(continued)

Botanical Name	Common Name	Occurrence
Solidago canadensis	Canada Goldenrod	Common
Solidago graminifolia	Grass-leaved Goldenrod	Common
Solidago juncea	Stiff Goldenrod	
Solidago rugosa	Wrinkle-leaf Goldenrod	Common
Solidago sempervirens	Sea-beach Goldenrod	Locally common
Taraxacum officinale	Common Dandelion	Common
Verbesina alternifolia	Yellow Ironweed	Common
Verbesina occidentalis	Small Yellow Crownbeard	Uncommon
Vernonia noveboracensis	Ironweed	Common
Xanthium italicum	Cocklebur	Uncommon
Xanthium strumarium	Cocklebur	Uncommon

Other Herbaceous Plant Species at Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resources Management Plan, 1987)

Botanical Name	Common Name	Occurrence
Abutilon theophrasti	Velvet Leaf	Scarce
Acalypha virginica	Three-seeded Mercury	Uncommon
Acnida cannabina	Water-hemp	Common
Agrimonia sp.	Agrimony	Common
Alisma sp.	Water Plantain	Scarce
Allium vineale	Field Garlic	Common
Amaranthus retroflexus	Pigweed	Uncommon
Anagallis arvensis	Scarlet Pimpernel	Common
Apocynum cannabinum	Indian Hemp	Uncommon
Arisaema triphyllum	Jack-in-the-Pulpit	Uncommon
Ascelpias incarnata	Swamp Milkweed	Uncommon
Ascelpias Syria	Common Milkweed	Common
Asparagus officials	Asparagus	Uncommon
Barbara vulgarize	Winter Creeps	Common
Bohemia cyiindrica	False Nettle	Common
Callitriche sp.	Water Starwort	Uncommon
Capselia bursa-pastoris	Shepherds Purse	Uncommon
Cassia mictitans	Sensitive Plant	Common
Cerastium vulgatum	Mouse-ear Chickweed	Common
Chenopdium album	Lamb's Quarters	Common
Chenopdium ambrosioides	Wormseed	Uncommon
Chimaphila maculate	Spotted Wintergreen	Scarce
Circaea quadrisulcata	Enchanters' Nightshade	Common
Collinsonia canadensis	Horsebalim	Uncommon
Commelina communis	Asiatic Day-flower	Infrequent
Daucus carota	Wild Carrot	Abundant
Desmodium cuspidatum	Bracted Tickclover	Uncommon
Desmodium sp.	Tick Trefoil	Common
Dianthus armeria	Deptford Pink	Uncommon

Other Herbaceous Plant Species at Aberdeen Proving Ground, Maryland (Continued)

Botanical Name	Common Name	Occurrence
Dioscorea villosa	Wild Yam	Uncommon
Duchesnea indica	Indian Strawberry	Uncommon
Epifagus virginiana	Beech-drops	Uncommon
Epilobium coloratum	Willow Herb	Uncommon
Erechtites hieracifolia	Pilewort	Common
Euphorbia corollata	Flowering Spurge	Uncommon
Euphorbia maculate	Wartweed	Common
Euphorbia presslii	Eyebane	Common
Fragaria chiloensis var. ananassa bailey	Garden Strawberry	Uncommon
Galium aparine	Goose Grass	Common
Galium sp.	Bedstraw	Common
Gerardia purpurea	Gerardia	Uncommon
Geum canadense	Avens	Uncommon
Glecoma hederaces	Ground Ivy	Common
Hedeoma pulegiodes	Pennyroyal	Uncommon
Plantathera sp. (Habenaria sp.)	Orchid	Scarce
Hemerocai]is fulva	Day Lily	Common
Heteranthera reniformis	Mud Plantain	Infrequent
Hibiscus palustris	Mallow Rose	Uncommon
Hydrocotyle sp.	Water Pennywort	Scarce
Hypericum punctatum	St. John's-wort	Uncommon
Impatiens	Jewel Weed	Common
Ipomoea purpurea	Morning Glory	Uncommon
Juncus effusus	Common Rush	Infrequent
Juncus tenuis	Path Rush	Common
Lamium purpureum	Red Dead Nettle	Uncommon
Lemna	Duckweed	Common

Lepidium virgincum	Pepper Grass	Common
Lespedeza cuneata	Lespedeza	Common
Lespedeza striate	Japanese Clover	Common

Other Herbaceous Plant Species at Aberdeen Proving Ground, Maryland (Continued)

Botanical Name	Common Name	Occurrence
Linaria vulgaris	Butter-and-eggs	Uncommon
Linum sp.	Flax	Uncommon
Lobelia inflate	Indian Tobacco	Scarce
Ludwigia palustris var. americana	False Loosestrife	Locally common
Medicago lupulina	Black Medick	Common
Melilotus alba	White Sweet Clover	Common
Melilotus officinalis	Yellow Sweet Clover	Uncommon
Mentha spicata	Spearmint	Uncommon
Mitchella repens	Partridge Berry	Uncommon
Mollugo verticillata	Carpet Weed	Uncommon
Monotropa uniflora	Indian Pipe	Scarce
Myriophyllum exalbescens	Water milfoil	Local
Nuphar luteuln	Yellow-water-lily	Uncommon
Oenothera biennis	Evening Primrose	Uncommon
Oenothera fruticosa	Sundrops	Uncommon
Oxalis sp.	Oxalis	Common
Passiflora lutea	Passion-flower	Scarce
Peltandra virginica	Arrow Arum	Common
Perilla frutesceus	Beefsteak Plant	Common
Petunia parvidlora	Ground-cherry	Scarce
Phytolacca americana	Pokeberry	Common
Pilea pumila	Cleatweed	Common
Plantago aristata	Bracketed Plantain	Common
Plantago lanceolata	English Plantain	Common
Plantago major	(Common) Broadleaved Plantain	Common
Plantago rugellii	Pale Plantain	Common
Plantago virginica	Dwarf Plantain	Uncommon
Podophyllum peltatum	Mayapple	Local

Polygala spp.	Milkwort	Common
Polygonum aviculare	Carpet Weed	Common

Other Herbaceous Plant Species at Aberdeen Proving Ground, Maryland
(Continued)

Botanical Name	Common Name	Occurrence
Polygonum erectum	Smart Weed	Common
Polygonum hydropiper	Water Pepper	Common
Polygonum hydropipervides	Wild Water Pepper	Common
Polygonum lapathifolium	Dock-leaved Smartweed	Common
Polygonum orientale	Princess' Feather	Scarce
Polygonum pensylvanicum	Pinkweed	Common
Polygonum pensylvanicum var. rosaeflorum	Rose Colored Pinkwee	Uncommon
Polygonum sagittatum	Tear Thumb	Common
Polygonum scandens	Climbing False Buckwheat	Common
Polygonum virginicum	Junip Seed	Common
Portulaca oleracea	Purslane	Uncommon
Portamogeton	Pondweed	Local
Potentilla simplex	Cinquefoil	Common
Prunella vulgaris	Heal-All	Uncommon
Pycnanthemum flexuosum	Narrow-leaved Mountain Mint	Uncommon
Rumex acetoneila	Sheep Sorrel	Common
Rumex crispus	Sour, or Curley, Dock	Common
Rumex obtusifolius	Bitter Dock	Uncommon
Sabatia stellaris	Marsh Pink	Uncommon
Sagittaria latifolia	Duck Potato	Common
Sanicula sp.	Black Snakeroot	Common
Saururus cernuus	Lizards-tail	Uncommon
Scrophularia marilandica	Carpenter's Square	Scarce
Silene antirrlina	Sleepy Catchfly	Uncommon
Smilacina racemosa	False Solomous Seal	Uncommon
Solanum americanum	Black Nightshade	Uncommon
Solanum carolinense	Horse Nettle	Common
Stellaria media	Common Chickweed	Common

Other Herbaceous Plant Species at Aberdeen Proving Ground, Maryland (Continued)

Botanical Name	Common Name	Occurrence
Strophostyles helvola	Wild Bean	Uncommon
Stylosanthes biflora	Pencil Flowers	Scarce
Symplocarpus foetidus	Skunk Cabbage	Infrequent
Teucrium eanadense	American Wood Sage	Uncommon
Toyara virginiana	Jump Seed	Common
Trifolium arvense	Rabbit-foot Clover	Common
Trifolium dubium	Low-hop Clover	Abundant
Trifolium pretense	Red Clover	Uncommon
Trifolium repens	White Clover	Abundant
Typha angustifoloa	Narrow-leaved Cattail	Abundant
Typha latifolia	Common Cattail	Infrequent
Uvuiaria sessilifolia	Bellwort	Uncommon
Vallisneria americana	Eel Grass	Local
Verbascum blattaria	Moth Mullein	Uncommon
Verbascum thapsus	Great Mullein	Common
Verbena hastata	Blue Vervain	Uncommon
Veronica arvensis	Corn Speedwell	Common
Vicia sp.	Vetch	Scarce
Viola sp.	Violet	Common
Wolffia papuiifera	Watermeal	Scarce

Fish Collected on Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resource Management Plan, 1987)

Common Name	Species
Alewife	*Alosa pseudoharengus*
American Eel	*Anguilla rostrata*
American Shad	*Alosa sapidissima*
Atlantic Croaker	*Micropogonias undulatus*
Atlantic Herring	*Clupea harengus*
Atlantic Menhaden	*Crevoortia tyrannus*
Atlantic Needlefish	*Strongylurn marina*
Atlantic Silverside	*Menidia menidia*
Atlantic Sturgeon	*Acipenser oxyrhynchus*
Banded Killifish	*Fundulus diaphanus*
Bay Anchovy	*Anchoa mitchelli*
Black Crappie	*Pomoxis nigromaculatus*
Black Drum	*Pogonias cromis*
Blue Spotted Sunfish	*Enneasanthus gloriosus*
Bluefish	*Pomatomus saltatrix*
Blueback Herring	*Alosa aestivalis*
Bluegill Sunfish	*Lepomis macrochirus*
Bridle Shiner	*Notropis bifrenatus*
Brown Bullhead	*Ictalurus nebulosus*
Butterfish	*Perprilus triacanthus*
Carp Sucker	*Carpoides carpio*
Channel Catfish	*Ictalurus punctatus*
Comley Shiner	*Notropis aoenus*
Common Carp	*Cyprinus carpio*
Creek Chubsucker	*Erimyzon oblongus*
Gizard Shad	*Dorosorna cepedianum*
Golden Shiner	*Notemigonus crysolencas*
Goldfish	*Carassius auratus*
Green Sunfish	*Lepomis cyanellus*
Hickory Shad	*Alosa mediocris*
Hog Choaker	*Trinectes maculatus*
Largemouth Bass	*Micropterus salmoides*
Longear Sunfish	*Lepomis megalotis*

Fish Collected on Aberdeen Proving Ground, Maryland
(Continued)

Common Name	Species
Naked Goby	*Gobiosoma bosci*
Northern Pipefish	*Syngnathus fuscus*
Northern Puffer	*Sphoeroides maculatus*
Northern Sea Robin	*prionotus carolinus*
Oyster Toadfish	*Opsanus tau*
Pumpkinseed	*Lepomis gibbosus*
Red Breast Sunfish	*Lepomis auritus*
Rough Silverside	*Membras martinica*
Satinfin Shiner	*Notropis analostanus*
Scaled Carp	*Cypnnus carpio*
Silver Hake	*Merluccis bilinearis*
Silver Perch	*Bairdiella chrysura*
Silvery Minnow	*Hybognathus nuchalis*
Smallmouth Bass	*Micropterus dolomieui*
Southern Harvestfish	*Perpillus para*
Spot	*Leiostomus xanthurus*
Spottail Shiner	*Notropis hudsonius*
Spotted Hake	*Urophycis regius*
Spotted Seatrout	*Cyroscion nebulosus*
Spotted Sucker	*Minytrema melanops*
Striped Bass	*Morone saxatilis*
Sucker sp.	*Minytrema saxatilis*
Summer Flounder	*Paralichthys dentatus*
Tessalated Darter	*Etheostoma olmstedi*
Tidewater Silverside	*Menidia beryllina*
Weakfish	*Cynoscion regalis*
White Catfish	*Ictalurus catus*
White Crappie	*Pomoxis annularis*
White Perch	*Morone americana*
Whitesucker	*Catotomus commersoni*
Winter Flounder	*Pseudopleuronectes americanus*
Yellow Bullhead	*Ictalurus natalis*
Yellow Perch	*Perca flavescens*

A Partial List of Mammals Found on Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resource Management Plan, 1987)

Common Name	Species
Beaver	*Castor canadensis*
Big Brown Bat	*Eptesicus fuscus*
Bobcat	*Lynx rufus*
Bob Lemming	*Synaptomys cooperi*
Eastern Chipmunk	*Tamias striatus*
Eastern Cottontail	*Sylvilagus floridanus*
Eastern Mole	*Scalapus aquaticus*
Eastern Pipistrelle	*Pipistrellus subflavus*
Eastern Harvest Mouse	*Reithrodontomys humulis*
Evening Bat	*Nycticeius humeralis*
Fox Squirrel	*Sciurus niger vulpinces*
Grey Fox	*Urocyon cinereoargenteus*
Grey Squirrel	*Sciurus carolinensis*
Horary Bat	*Lasiurus cinereus*
Keen's Bat	*Myotis keenii*
Least Shrew	*Crytotis parva*
Little Brown Bat	*Myotis lucifugus*
Long-tailed Weasel	*Mustela frenata*
Masked Shrew	*Sorex cinereus*
Meadow Jumping Mouse	*Zapus hudsonius*
Meadow Vole	*Micrtus pennsylvanicus*
Mink	*Mustela vison*
Muskrat	*Ondatra zibethicus*
Norway Rat	*Rattus norvegicus*
Opossum	*Didelphis virginiana*
Pigmy Shrew	*Microsorex hoyl*
Pine Vole	*Mcrotus pinetorum*
Raccoon	*Procyon rotor*
Red Bat	*Lasiurus borealis*
Red Squirrel	*Tamiascurrus hudsonicus*
Rice Rat	*Oryzomys palustris*
River Otter	*Lutra canadensis*
Short-haired Bat	*Blarina brevicareda*

A Partial List of Mammals Found on Aberdeen Proving Ground, Maryland (Continued)

Common Name	Species
Silver-haired Bat	*Lasionycteris noctivagars*
Southern Flying Squirrel	*Glauconys volans*
Star-nosed Mole	*Condylura cnstata*
Striped Skunk	*Mephitis mephitis*
White-footed Mouse	*Peromyscus leucopus*
White-tailed Deer	*Odocoileus virginianus*
Woodchuck	*Marmota monax*

Reptiles Recorded on Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resource Management Plan, 1987)

Common Name	Species	Status
Black Rat Snake	*Elaphe o. obsoleta*	Common
Bog Turtle	*Clemmys muhlenbergi*	Abundant
Eastern Box Turtle	*Terrepene c. carolina*	Abundant
Eastern Garter Snake	*Thamnophis s. sirtalis*	Common
Eastern Hognose Snake	*Heterodon platyrhinos*	Rare
Eastern Kingsnake	*Lampropelitis g. getulus*	Rare
Eastern Milk Snake	*Lampropeltis doliata*	Rare
Eastern Mud Turtle	*Kinosternon s. subrubrum*	Abundant
Eastern Painted Turtle	*Chrysemys p. picta*	Abundant
Eastern Ribbon Snake	*Thamnophis s. sauritus*	Uncommon
Eastern Worm Snake	*Carphophis a. amoenus*	Uncommon
Five-lined Skink	*Eumaces fasciatus*	Common
Northern Black Racer	*Colber c. constrictor*	Common
Northern Diamondback Terrapin	*Malaclemys t. terrapin*	Abundant
Northern Fence Lizard	*Sceloporus undulatus hyacinthinus*	Rare
Northern Ringneck Snake	*Diadophis punctatus edwardsi*	Rare
Northern Water Snake	*Natrix s. sipedon*	Abundant
Queen Snake	*Regina s. septemvittata*	Rare
Red-bellied Turtle	*Chrysemys rubriventris*	Rare
Red-eared Turtle	*Chrysemys scripta clegans*	Uncommon
Snapping Turtle	*Chelydra s serpintina*	Abundant
Spotted Turtle	*Clemmys guttata*	Abundant

Amphibians Recorded on Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resource Management Plan, 1987)

Common Name	Species	Status
American Toad	*Bufo a. americanus*	Common
Bullfrog	*Rana catesbeiana*	Abundant
Eastern Gray Treefrog	*Hyla v. versicolor*	Abundant
Fowler's Toad	*Bufo woodhousei fowelri*	Abundant
Green Frog	*Rana clamitans melanota*	Abundant
Green Treefrog	*Hyla cinerea*	Uncommon
Marbled Salamander	*Ambystoma opacu*	Uncommon
Northern Cricket Frog	*Acris crepitans crepitans*	Abundant
Northern Leopard Frog	*Rana p. pipiens*	Rare
Northern Spring Peeper	*Hyla c. crucifier*	Abundant
Pickeral Frog	*Rana palustris palustris*	Uncommon
Red-backed Salamander	*Plethodon c. cinereus*	Common
Red Eft	*Diemictlus viridesen*	Uncommon
Southern Leopard Frog	Rana p. *sphenocephala* A	Abundant
Spotted Salamander	*Ambystoma maculatum*	Common
Upland Chorus Frog	*Pseudacris triseriata feriarum*	Common
Wood Frog	*Rana sylvatica*	Uncommon

A List of Birds Observed on Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resource Management Plan, 1987)

Common Name	Species	Status
Acadian Flycatcher	*Empidonax virescens*	Common
American Bittern	*Botaurus lentiginosus*	Uncommon
American Crow	*Corvus brachyrhynchos*	Common
American Kestrel	*Falco sparverius*	Common
American Goldfinch	*Carduelis tristis*	Common
American Redstart	*Setophaga ruticilla*	Common
American Robin	*Turdus migratorius*	Common
American Tree Sparrow	*Spizella arbarea*	Common
American Woodcock	*Philohela minor*	Fairly
Common Bald Eagle	*Haliaeetus leucocephalus*	Rare
Barn Owl	*Tyto alba*	Uncommon
Barn Swallow	*Hirundo rustica*	Common
Barred Owl	*Strix varia*	Common
Belted Kingfisher	*Megaceryle alcyon*	Common
Black Duck	*Anas rubripes*	Common
Black Vulture	*Coragyps atuatus*	Uncommon
Blue-grey Gnatcatcher	*Polioptila caerulea*	Common
Blue Grosbeak	*Guiraca caerula*	Fairly
Common Blue Jay	*Cyanocitta cristata*	Common
Blue-winged Teal	*Anas diseurs*	Uncommon
Bobolink	*Dolichanyx oryzivorus*	Uncommon
Bobwhite	*Colinus virginianus*	Common
Brown Creeper	*Certhia familiurus*	Common
Brown-headed Cowbird	*Molothrus ater*	Common
Brown Thrasher	*Toxostoma rufum*	Common
Canada Goose	*Branta canadensis*	Common
Canvasback	*Aythya valiznenia*	Uncommon
Cardinal	*Carninalis cardinalis*	Common
Carolina Chickadee	*Parus carolinensis*	Fairly
Common Carolina Wren	*Thryothorus ludovicianus*	Common
Catbird	*Dumetella carolinensis*	Common
Cedarwaxwing	*Bombycilla cedrorum*	Common
Chimney Swift	*Chaetura pelagica*	Common

A List of Birds Observed on Aberdeen Proving Ground, Maryland
(Continued)

Common Name	**Species**	**Status**
Chipping Sparrow	*Spizella passerina*	Common
Common Moorhen	*Gallinula chloropus*	Uncommon
Common Goldeneye	*Bucephaia clangula*	Uncommon
Common Grackle	*Quiscalus quiscala*	Common
Common Loon	*Gavia immer*	Uncommon
Common Merganser	*Mergus merganser*	Uncommon
Common Junco	*Junco hyemalis*	Common
Common Yellowthroat	*Geothylpis trichas*	Common
Downy Woodpecker	*Picoides pubescens*	Common
Eastern Bluebird	*Sialia sialis*	Common
Eastern Kingbird	*Tyrannus trannus*	Common
Eastern Meadowlark	*Sturnella magna*	Common
Eastern Phoebe	*Saornis phoebe*	Common
Eastern Wood Pewee	*Contopus virens*	Common
Field Sparrow	*Spizella pusilla*	Common
Fish Crow	*Corvus ossifragus*	Common
Fox Sparrow	*Passerella iliaca*	Common
Golden Eagle	*Aquila chrysaetus*	Rare
Golden-crowned Kingtot	*Regulis satrapa*	Uncommon
Great Black Backedgull	*Larus marinus*	Common
Great Blue Heron	*Ardea herodias*	Common
Great Crested Flycatcher	*Myiarchus crintus*	Common
Great Egret	*Casmeradius albus*	Uncommon
Great Horned Owl	*Bubo virginianus*	Uncommon
Greater Scaup	*Aythya marila*	Uncommon
Great Heron	*Butorides stria*	Uncommon
Hairy Woodpecker	*Picoides villosus*	Common
Herring Gull	*Larus argeutatus*	Common
Horned Grebee	*Podiceps auritus*	Uncommon
House Finch	*Carpodacus mexicanus*	Uncommon

House Sparrow	*Passer domesticus*	Common

A List of Birds Observed on Aberdeen Proving Ground, Maryland
(Continued)

Common Name	Species	Status
House Wren	*Troglodytes aedon*	Common
Indigo Bunting	*Passerina cyanea*	Common
Kentucly Warbler	*Oporornis formosus*	Uncommon
Killdeer	*Charadrius vociferus*	Common
Laughing Gull	*Larus atricilla*	Rare
Loggerhead Shrike	*Lanius ludovicianus*	Uncommon
Long-billed Marsh Hen	*Cistothorus palustris*	Common
Mallard	*Anas platyrhyners*	Common
Mourning Dove	*Zenaida macroura*	Common
Northern Flicker	*Colaptes auratus*	Common
Northern Harrier	*Circus cyaneus*	Common
Northern Mockingbird	*Mimus polyglottos*	Common
Northern Oriole	*Icterus galbula*	Uncommon
Oldsquaw	*Clangula hyemalis*	Uncommon
Orchard Oriole	*Icterus spurius*	Common
Osprey	*Pandion haliaetus*	Uncommon
Ovenbird	*Seiurus aurocapillus*	Uncommon
Parula Warbler	*Parula Americana*	Uncommon
Peregrine Falcon	*Falco peregrinus*	Rare
Red-bellied Woodpecker	*Melanerpes carolinus*	Common
Red-eyed Vireo	*Vireo olivaceus*	Common
Red-shouldered Hawk	*Buteo lineatus*	Uncommon
Red-tailed Hawk	*Buteo jamaicensis*	Common
Red-winged Blackbird	*Agelaius phoeniccus*	Common
Ring-billed Gull	*Larus delawarensis*	Common
Ring-necked Pheasant	*Phasianus colchicus*	Common
Rock Dove	*Columbia livia*	Common
Rufous-sided Towhee	*Pipilo erythrophthalmus*	Common
Rusty Blackbird	*Euphagus carolinus*	Uncommon
Savannah Sparrow	*Passerculus sandwichensis*	Uncommon
Scarlet Tanager	*Piranga olivacea*	Common
Song Sparrow	*Melospiza melodia*	Common

Sora *Porzana carolina*
Uncommon

A List of Birds Observed on Aberdeen Proving Ground, Maryland (Continued)

Common Name	Species	Status
Snowy Egret	*Egretta thala*	Rare
Starling	*Sturrus vulgaris*	Common
Summer Tanager	*Piranga rubra*	Uncommon
Trail's Flycatcher	*Empidonax traillii*	Uncommon
Tree Swallow.	*Iridoprocne bicolor*	Common
Tufted Titmouse	Parus *bicolor*	Common
Turkey Vulture	*Cathartes aura*	Common
Warbling Vireo	*Vireo gilvus*	Uncommon
Wilson's Warbler	*Wilsonia pusilla*	Rare
Whistling Swan	*Olor columbianus*	Common
White-breasted Nuthatch	Sitta *carolinensis*	Common
White-eyed Video	Vireo *griseus*	Common
White-throated Sparrow	*Zonotrichia albicollis*	Common
Wild Turkey	*Meleagris glallopavo*	Common
Wood Duck	*Air sponsa*	Uncommon
Wood Thrush	*Hylocichla mustelina*	Common
Yellow-bellied Sapsucker	*Sphyrapicus varius*	Uncommon
Yellow-breasted Chat	*Ieteria virens*	Common
Yellow-billed Cuckoo	*Coccyzus amencanus*	Common
Yellow-rumped Warbler	*Dendroica coronata*	Uncommon
Yellow-throated Video	*Vireo flavifrons*	Uncommon
Yellow Warbler	*Dendroica petechia*	Common

Endangered and Threatened Species Reported on or Near
Aberdeen Proving Ground, Maryland
(Data taken from APG Natural Resource Management Plan, 1987)

Common Name	Species	Status
American Bittern	*Botarus lentiginosus*	In Need of Conservation in Maryland
Atlantic Sturgeon	*Acipenser axyrhynchus*	Regionally Rare
Bald Eagle	*Haliaeetus leucocephalus*	Federally
Endangered		
Canada Anemone	*Anemone canadensis*	State Extirpated
Clammyweed	*Polanisia dodecandra*	State Extirpated
Gasping-leaved Pondweed	*Potamogeton perfoliatus*	State Rare
Logperch	*Percina caprodes*	State Highly
Rare		
Maryland Darter	*Etheostoma sellare*	Federally
Endangered		
Northern Harrier	*Circus cyaneus*	State Rare
Prickly Hornwort	*Ceratophyllum muricatum*	State Highly
Rare		
Sender Pondweed	*Potamogeton pussillus*	State Highly
Rare		
Seven-angled Pipewort	*Priocaulon septangulare*	State Extirpated
Shortnose Sturgeon	*Acipenser brevirostrum*	Federally
Endangered		
Spiral Pondweed	*Potamogeton spirillus*	State Highly
Rare		
Spongy Lophotocarpus	*Sagittaria calycina*	State Threatened
Tickseed Sunflower	*Bidens coronata*	State Endangered
Toothed Sedge	*Cyperus dentatus*	State Highly Rare

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APPENDIX H

ANALYSIS OF THE PROGRAMMATIC
TOXIN RISK/ISSUE CATEGORY FROM THE
BIOLOGICAL DEFENSE RESEARCH PROGRAM FINAL
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

3. Toxins

3.1 Introduction

The toxins studied in the BDRP are all derived from natural sources, and are thus designated "toxins of biological origin." Unlike many of the non-naturally occurring toxins, those that exist only as a result of chemical synthesis, the toxins of biological origin all exist in some ecological niche. In addition, these toxins are bioorganic molecules. Some are proteins or peptides; others are small alkaloid -like molecules. All are susceptible to degradation, denaturation or decay, whether within an organism or upon exposure to heat, acids, bases, enzymes or, in some cases, simple dilution. Laboratory work with toxins may pose risks to an individual who becomes exposed accidentally to tome material, but unlike organisms, toxins are not living entities and do not propagate themselves in a host or in the environment. Thus, unlike disease-causing organisms, toxins c annot be transmitted from person -to-person (or animal or insect) (see Appendix 9).

3.2 Types of Studies Conducted Using Toxins

Various toxins are used throughout research, development, and testing activities. Studies conducted include basic research to elucidate the mechanism of action of a particular toxin, preparation of antibodies to a toxin, structural analyses to identify the parts of a toxin responsible for immunity, production of toxoids (inactivated toxins which are not toxic but can elicit an immune response) in support of vaccine development efforts, testing of decontaminants to determine efficacy against toxins, development and testing of methodologies with cellular receptors or antibodies for detection and identification of toxins, and testing of personal protective devices for effectiveness when exposed to toxins.

Representative toxins used in the BDRP include the following: botulinum toxin, anthrax toxin, staphylococcal enterotoxins, plant toxins such as ricin, toxins derived from snake and arachnid venoms, toxins produced by blue-green algae and other marine and fresh water organisms, tetrodotoxin, and trichothecene mycotoxins. Physiologically active compounds, particularly peptide hormones and neuromodulators, are included for consideration in the toxin category because excesses of these compounds can cause physiological imbalances similar to those caused by some toxins

3.3 Rationale for the Use of Toxins in the BDRP

Toxins have traditionally been identified as significant biological threat agents (9) and thus are the focus of BDRP efforts to develop defensive measures such as vaccines, drugs, and protective material.

3.4 Environmental, Health and Safety Considerations

Because toxins are non-living and cannot establish themselves in the natural environment, they pose very little threat to the environment outside of the laboratory. BDRP laboratory workers who handle anthrax or botulinum toxins (or the organisms that produce them) in quantities larger than those which would be encountered in a typical clinical or diagnostic laboratory are immunized with the appropriate toxoid (botulinum) or vaccine (anthrax). Although there are no nationally recommended biosafety levels for work with tomes per se, the CDC-NIH guidelines (1) recommend biosafety level 2 for work conducted with Clostridium botulinum, the bacterium that produces the potent botulinum neurotoxin. In addition, appendix F of the NIH Guidelines for Research involving Recombinant DNA Molecules (6) addresses the appropriate levels of biosafety for use in cloning toxic molecule genes. For the most potent classes of toxins, biosafety levels 2 or 3 are recommended, depending upon the biological containment (host -vector) system used (see Appendix 10). Unless there are procedures that would pose an increased risk to the laboratory worker, such as potential creation of aerosols or work with highly concentrated materials, work with toxins is appropriately conducted in biosafety level 2 laboratories.

3.5 Waste Materials

All laboratory materials containing or exposed to toxins are decontaminated, either chemically or with high heat, prior to disposal.

3.6 Security

Stock quantities of toxins are maintained in locked freezers or refrigerators. For those toxins that are studied within BL-3 laboratories, additional security is provided by the overall security provisions and access restrictions for such areas (see Appendix 12). Most of the toxins studied in the BDRP are available from commercial chemical/biochemical companies that sell research, diagnostic, and clinical reagents to biomedical laboratories. The quantities of any given toxin that are marketed and shipped are marked with appropriate warnings regarding potential biohazards, and are sold only to institutions which appropriately identify themselves as legitimate ate biomedical organizations.

3.7 Accidents and Incidents

The handling of toxins known to cause disorders in humans always poses a potential risk to laboratory personnel. These risks are minimized by the use of special biosafety facilities, equipment and procedures for those activities that would otherwise cause a high potential for exposure. In laboratories performing basic research studies with toxins, only minute quantities of a particular toxin are in use at any given time, and these small quantities pose virtually no risk to the laboratory workers. While some of the toxins studied, for example, botulinum toxin or tetrodotoxin, are someone's lethal to man even with medical treatment, most of the toxicoses caused by other toxins can be treated successfully with supportive care and/or drugs which antagonize the action of the particular toxin.

There has been no occurrence in any laboratory worker associated with the BDRP of intoxication or poisoning as a result of handling toxins of biological origin.

3.8 Program Benefits

The development of vaccines and therapeutic drugs for potential biological warfare threat toxins enhances the national defense posture with respect to these threats. The basic research conducted to understand the mechanism of action of many of these toxins contributes to the general scientific community. Methods of detection developed for toxins of interest in the BDRP have many potential applications in the public health arena, where food borne toxins (such as saxitoxin, enterotoxins, botulinum toxin, mycotoxins) often cause serious economic and medical problems. It is of interest to note that one of the most potent toxins known to man, botulinum toxin, has been used successfully as a specific treatment for a disorder of the eye muscles known as blepharospasm. There are active efforts on the part of the biomedical community to develop methods for targeting toxins to cancerous cells and tumors, thus harnessing the potent toxicity of these materials for a positive effect.

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APPENDIX I

MAXIMUM CREDIBLE EVENT FOR CSM

SUBJECT: Safety Submission for the US Army Medical Research Institute of Chemical Defense Building E3081

A. GENERAL. A review has been conducted of the Safety Submission for the US Army Medical Research Institute of Chemical Defense (USAMRICD), Building E3081. During such, the necessity to update the document has been realized. Therefore, the following changes are to be made.

B. VENTILATION SPECIFICATIONS.

All laboratories will be maintained at negative pressure in relation to the corridor. The system is equipped with redundant CBR filters (consisting of modular units containing a preflight, high efficiency particulate filtration, charcoal filtration, charcoal filtration, and high efficiency particulate filtration). The exhaust system for the toxic hoods provides an average face velocity of 100 +/- 10 linear feet per minute (lfpm) through a work opening of 18 inches. The hood system is equipped with both visible and audible alarm devices that give warning if the average face velocity -falls below 80 lfpm.

C. DEVELOPMENT OF A MAXIMUM CREDIBLE EVENT.

1. In hypothesizing the ways in which toxic agent will be handled within Bldg E3081, it is apparent that the MCE for room 277 would represent the "worst case" scenario. Since GB is the most volatile of the Chemical Surety Materiel (CSM) used in Bldg E3081, it has been used in these calculations to compute the MCE.

2. During an MCE, the amount of CSM released into the atmosphere via evaporation must be considered with the possibility of contamination of areas outside the surety area. Since each agent room is maintained under a negative pressure, all evaporated agent will be contained within the room or hood and exhausted through the fume hood and filter elements associated with each room. The amount of each agent that evaporated into the hood is calculated by the methodology presented in Technical Paper No. 101 and is diluted by the airflow of the hood(s) and subsequently reduced by the Charcoal filtration system. The evaporation calculations were performed utilizing the Chemical Research

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Development and Engineering Center program, Personal Computer Program for Hazard Prediction (D2PC) "[2].

5. Maximum Credible Events for each group of rooms.

a. Room 277. After considering the possible credible events for room 277, Bldg E3081, the MCE is considered to be the breakage or spillage of the contents of a maximum allowed quantity of CSM within the use hood and at the same time the operator is contaminated with a small portion of the contents. In this scenario the overriding priority of the operator and his buddy would be to preserve the life of the operator. As such, the spill would not likely be decontaminated by the operators, instead they would sound the alarm to evacuate the building and thus activate the APG Chemical Accident/Incident Response and Assistance (CAIRA) Plan. U.S Army Technical Escort Unit (USATEU) will then respond, within 60 minutes, to decontaminate. A total time to decontamination of 90 minutes in this scenario would be reasonable. Thus for the calculations, the entire quantity would be considered to be available for evaporation and would be exhausted by one of the use hoods in 277. These hoods exhaust 900 CFM (25.47m). With the above presented scenario the following itemizes the maximum quantity per container and the exhaust stack release versus the 1% lethality during the MCE is presented for room 277:

Agent	Maximum Possible Spill	Total Challenge (g)	Prefilter Concentration (mg/m3)	Exhaust Stack Release (mg-min/m3)	1% Lethality (mg-min/m3)
GB	1000ml	172	75.028	.000075028	10

D. CONCLUSIONS.

It is therefore concluded that the Maximum Credible Event (MCE) within E3081 will not result in the release of toxic concentrations outside Building E3081 in excess of the 1% lethality criteria presented in DoD 5154.4S. Thus a 1% lethality distance arc during an MCE for Building E3081 does not exist. Also neither during an MCE nor during normal operations will the stack emission standards presented in DA PAM 40-8 and in Draft DODI 6055.9 be exceeded due to the containment systems to be installed.

[2] Personal Computer Program for Chemical Hazard Prediction (D2PC) , Chemical Research Development and Engineering Center Report crdec-, C.G. Whitacre, et al., January 1987.

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APPENDIX J

MAXIMUM CREDIBLE EVENT FOR BOTULINUM TOXIN FROM THE BIOLOGICAL DEFENSE RESEARCH PROGRAM FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

2.2. MCE: BOTULINUM TOXIN

Botulinum toxin is an exotoxin of *Clostridium botulinum,* a common soil pathogen, and is most familiar to the public as a causative agent in food poisoning, notably canned seafoods or low acid vegetables (see Appendix 7). Botulinum A toxin is the most potent toxin known in the world today. This toxin is currently studied at USAMRIID as part of the BDRP, and data are available to calculate the risks associated with a laboratory accident. Botulinum toxin, a non -volatile protein, is 3.2 X 105 times as toxic intraperitoneally (IP) in mice as the highly volatile chemical nerve agent, soman, an organophosphate. A credible worst-case scenario for the use of this toxin in a high containment research suite would again be the generation of an aerosol from the breakage of spinning centrifuge bottle containing TOXIN in various stages of purification. The scenario is similar to the MCE for Q fever (paragraph 2.1 preceding) but there are also some notable differences as well. The initial stages of purification do not require centrifugation, thus when the processing stage of this MCE is reached, the volume of toxin being purified would be less than the volume for Q fever, thus leakage of only one centrifuge tube is postulated. Because of the lethality of Botulinum toxin, this centrifugation step is performed in a Class II safety cabinet. Also because a toxin MCE is being included for comparative purposes, the minutiae have been omitted, however all pertinent steps have been included.

2.2.1 In this analysis, we use an example of the rupture of a 250 -ml centrifuge tube containing 240 ml of toxin at a concentration of 2 x 109 mouse IP ld 50 (mipld 50 per ml of 50% pure type A botulinum toxin). One mipld 50 is the amount of toxin required to cause death in 50% of the mice injected IP. The toxic dosages of botulinium toxin are very different when comparing toxin aerosol exposures (human respiratory) with toxin solution challenges (mouse IP). It has been estimated that, where a given concentration of toxin in an aerosolized solution yields one human respiratory LD 50 (HRLD 50), the same concentration injected IP into mice is approximately 2.38 x 103 MIPLD 50 i.e. the human dose is about 2400 times the mouse dose.

If a centrifuge bottle breaks during centrifugation, an aerosol of the toxin -containing solution would be generated within the rotor of the centrifuge. Most of the solution would remain unaerosolized and be contained within the covered rotor. Of that which was generated into an aerosol within the centrifuge cabinet, approximately 90% would settle as liquid droplets on the inside of the chamber. Both of these areas (the inside of the rotor and the centrifuge cabinet) can be decontaminated efficiently by trained research personnel who have taken the appropriate personal protection measures and employ the appropriate decontamination procedures to handle the spill.

Therefore, only an equivalent of 0.1 ml of the total 240 ml of toxin -containing solution would be aerosolized into 1 to 5 micron particles, median mass diameter. This is an efficiency of 0.04%, in comparison with the lesser efficiency of 0.001% for the Q fever slurry. This quantity is approximately 8.4 104 HRLD50 (0.1 2 109 2.38 x 103). With an inward face air velocity of at least 75 feet per minute at the work opening of the Class II cabinet, (see Appendix 11) essentially all of the aerosol generated passes through the cabinet Hepa filters (99.97% efficiency) before entering the containment suite duct system where it now passes through a Baggy Filter (95% efficiency). Thus, only 25.2 HRLD50 enters the duct system of the suite and a maximum of 1.3 HRLD50 could be discharged out of the exhaust stock. Within inches of the exhaust stack, this amount of toxin would undergo infinite dilution in the atmosphere and the toxin itself would rapidly undergo physical degradation. Thus, this concentration of toxin released through the exhaust stack, would be negligible and would pose no threat to the human or animal populations. Immunized at -risk workers exposed to what little, if any, toxin that escaped out the opening of the Class II cabinet would not suffer any adverse effects. Animal experiments have shown that immunization with botulinum toxoid provides good protection from aerosolized botulinum tome.

** Not in Use at USAMRICD

APPENDIX K

DRAFT EA PUBLIC INVOLVEMENT

DRAFT EA PUBLIC INVOLVEMENT

I. Recipients of Notice of Availability. Executive Summary. and Cover Letter:

The Honorable Helen Delich Bentley
1610 Longworth House Office Building
Washington, DC 20515-2002

State Delegate Rosemary Bonsack, M.D
118 W. Bel Air Avenue
Aberdeen, MD 21001-3238

State Delegate David Craig
368 Congress Avenue
Havre de Grace, MD 21078-3029

U.S. Environmental Protection Agency
841 Chestnut Building (3E543)
Philadelphia, PA 19107

State Senator Habern Freeman
2208 Old Emmorton Road
Bel Air, MD 21015

The Honorable Wayne T. Gilchrest
502 Cannon House Office Building
Washington, DC 20515-2001

The Honorable John Glenn
503 Hart Senate Office Building
Washington, DC 20510

Dr. Ray R. Keech, Superintendent
45 East Gordon Street
Bel Air, MD 21014

The Honorable Carl Levin, Chairman
Subcommittee on Oversight of Government Management
442 Hart Senate Office Building
Washington, DC 20510

Maryland Department of the Environment
2500 Broening Highway
Baltimore, MD 21224

Maryland Department of Transportation
P.O. Box 8755
Baltimore-Washington International Airport,
MD 21240

Maryland Department of Natural Resources
580 N. Taylor Avenue
Annapolis, MD 21401

The Honorable Barbara A. Mikulski
320 Hart Senate Office Building
Washington, DC 20510

Dr. Richard Pappas, President
Harford Community College
401 Thomas Run Road
Bel Air, MD 21014

State Delegate Mary Louise Preis
9 W. Courtland Street
Bel Air, MD 21014-3701

The Honorable Senator Paul S. Sarbanes
332 Dirksen Senate Office Building
Washington, DC 20510

Office of the Governor
Governor William D. Schaefer
301 West Preston Street
Baltimore, MD 21224

Mr. Ed Ward, Director
Harford County Chamber of Commerce
108 S. Bond Street'
Bel Air, MD 21014

II. Recipients of NOA. Cover Letter. and Preliminary Draft EA

Mr. William McFaul, Administrator
Town of Bel Air
39 Hickory Avenue
Bel Air, MD 21014

Eileen Rehrmann, County Executive
Harford County
220 S. Main Street
Bel Air, MD 21014

Jeremy Rifkin
Foundation on Economic Trends
1130 17th Street, NW
Suite 630
Washington, DC 20036

III. Those receiving the Draft EA by request:

Charles S. Ellis, Jr.
President, Gregg Neck Park Civic Association
31475 Sassafras River Road
Galena, MD 21635

Dr. Barb Rosenberg
Division of Natural Sciences
State University of New York
Purchase, NY 10577

Susan Scotto
Office of Strategic Planning and Policy Coordination
Maryland Department of the Environment
2500 Broening Highway
Baltimore, MD 21224

Stephen Stawski
19 Garden Street
Cambridge, MA 02138

IV. Libraries receiving the Draft EA:

Harford County Public library
Bel Air Branch
100 Pennsylvania Avenue
Bel Air, MD 21014

Harford County Public library
Edgewood Branch
2205 Hanson Road
Edgewood, MD 21040

Maryland Department
Attn: Jeff Korman
Pratt Library
400 Cathedral Street
Baltimore, MD 20201

Kent County Library
Attn: Anne Briggs
408 High Street
Chestertown, MD 21620

V.

The Aegis
512 Plumtree Road
Bel Air, MD 21014

The Baltimore Sun
501 North Calvert Street
Baltimore, MD 21224

Kent County News
P.O. Box 30
Chestertown, MD 21620

NOTICE OF AVAILABILITY - THE AEGIS

Homestead Publishing Co.

THE AEGIS • THE RECORD • THE SUNDAY WEEKLY • APG NEWS •

Notice Of Availability

Draft Environmental Assessment for The U. S. Army Medical Research Institute of Chemical Defense

The United States Army Medical Research Institute of Chemical Defense (USAMRICD) announces the availability of a Draft Environmental Assessment (EA) for public review and comment. The proposed action and subject of this EA is the continuation of work, under direction of the U.S. Army Medical Research and Development Command (USAMRDC), at USAMRICD which is located at the Edgewood Area, Aberdeen Proving Ground, Maryland.

USAMRICD activities are conducted under two programs funded by Congress and implemented through the Department of Defense (DoD) by the Army. Approximately 80 per cent of USAMRICD efforts are performed under the Medical Chemical Defense Research Program (MCDRP) and approximately 20 per cent are performed under the medical Biological Defense Research Program (BDRP).

USAMRICD is the lead DoD laboratory for fundamental and applied research in medical defenses against chemical agents. The mission of USAMRICD is to conduct research and support development, testing, and evaluation of materiel to protect U.S. forces from, and to treat casualties of, chemical agents. Its work includes fundamental and applied research directed toward development of protective measures against chemical agents and medical treatments for use by casualties of chemical agents. USAMRICD also conducts research in medical defense against toxins and supports the development of information resources in areas concerning the prevention and medical management of chemical casualties.

This EA is tiered in part to the Biological Defense Research Program's Final Programmatic Environmental Impact Statement April 1989 (Record of Decision, November 1989). Impacts discussed in the EA are not considered to have any significant adverse effects upon the quality of the environment.

The USAMRICD Draft EA is available for public review and comment. Copies are available at the Harford County Public Library, Bel Air Branch, 100 Pennsylvania, Ave., Bel Air, MD 21014; the Harford County Library, Edgewood Branch, 2205 Hanson Rd., Edgewood, MD 21040; the Pratt Library, Maryland Department, 400 Cathedral St., Baltimore, MD 20201; and the Kent County Library, 408 High St., Chestertown, MD 21620. A copy of the document may be obtained by writing to Commander, USAMRICD, ATTN: SGRD-UV-R, Mr. Lloyd Roberts, Aberdeen Proving Ground, MD 21010-5425. Written comments should be submitted to the same address. Written comments for consideration in preparing the Final EA must be received no later than October 15, 1992.

Bel Air, Md., Sept 16 1992

This is to Certify, That the annexed Notice

was inserted in the Aegis, a newspaper printed and published in Harford County, once in each of One successive weeks before the 16th day of Sept, 1992

[signature] Business Manager.

NOTICE OF AVAILABILITY - THE KENT COUNTY NEWS

THIS IS TO CERTIFY. That the annexed Notice was inserted in the KENT COUNTY NEWS, a newspaper printed and published in Kent County, Md., once in each of 1 successive weeks before the 18th day of Sept 1992

By Patty

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KN-9-16-1t-23S

NOTICE OF AVAILABILITY - THE BALTIMORE SUN

THE BALTIMORE SUN
BALTIMORE, MARYLAND 21278-0001

9/16/ 19 92

WE HEREBY CERTIFY, *that the annexed advertisement of*
Dr. John R. Beaver

was published in "THE BALTIMORE SUN" *a daily newspaper printed and published in the City of Baltimore* 9/15/92

Morn.

4070

The Baltimore Sun Company,
By Gilbert E. Hynes

LEGAL NOTICES (265)

NOTICE OF AVAILABILITY
Draft Environmental Assessment for
The U.S. Army Medical Research Institute of Chemical Defense

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NOTICE OF AVAILABILITY - THE BALTIMORE SUN

THE BALTIMORE SUN
BALTIMORE, MARYLAND 21278-0001

9/18/ 19 92

WE HEREBY CERTIFY, *that the annexed advertisement of*

Dr John R Beaver
C/O Telephone Inc.

was published in "THE BALTIMORE SUN", *a daily newspaper printed* *nd published in the City of Baltimore* 9/17/92

mom

The Baltimore Sun Company,

4070

By Gilbert E. Hynes

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NOTICE OF AVAILABILITY - THE BALTIMORE SUN

THE BALTIMORE SUN
BALTIMORE, MARYLAND 21278-0001

9/21 19 92

WE HEREBY CERTIFY, *that the annexed advertisement of* Dr. John R. Beaver C/O Telemarc, Inc.

was published in "THE BALTIMORE SUN" *a daily newspaper printed and published in the City of Baltimore* 9/19/92

The Baltimore Sun Company,
By J. Pendleton

4070

LEGAL NOTICES (265)

NOTICE OF AVAILABILITY
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APPENDIX L

PUBLIC COMMENTS ON THE DRAFT EA AND RESPONSES TO THE COMMENTS

HARFORD COUNTY GOVERNMENT

OFFICE OF THE COUNTY EXECUTIVE

November 3, 1992

Commander, USAMRICD
Attn: SGRDUV-R, Mr. Lloyd Roberts
U.S. Army Medical Research Institute for Chemical Defense
Aberdeen Proving Ground, Maryland 21010-5425

Re: Environmental Assessment (Draft)
U.S. Army Medical Research Institute for Chemical Defense (USAMRICD)

Gentlemen:

We have completed a review of the referenced document dated 15 September 1992. As we understand the purpose of the Environmental Assessment, the U.S. Army is reviewing the USAMRICD facilities and operations at the Edgewood Area of the Aberdeen Proving Ground for the purpose of evaluating the future disposition of the activity. As stated in the document, the preferred alternative is the continuation of the activity in its current scope and location.

The Harford County Government offers the following comments which we would like to see addressed in the final draft of the Environmental Assessment.

1. The Environmental Assessment (EA) discusses in detail the use of chemical surety materiels in the laboratory, as well as the handling and disposal of contaminated waste materiel. The provisions for protection of public health and the environment rely heavily upon the standard operating procedures (SOPs) to prevent releases of dangerous materials to the environment. As SOPs are reliant upon practices of personnel, the procedures cannot be considered failsafe. Recent occurrences at the Aberdeen Proving Ground have confirmed that materials which require special handling are sometimes mislabeled or not accounted for. We encourage continued diligence in development of failsafe systems.

2. In general, the discussion of Waste Stream Management is somewhat ambiguous with respect to the path of disposal of waste products from the facility. Procedures should be presented that ensure that the waste stream which is delivered to the Harford Waste-to-Energy plant is not cross-contaminated as a result of laboratory activities. The report also needs to describe in detail the procedures that ensure that hazardous, radioactive, and

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CSM waste are not delivered to inappropriate waste disposal facilities.

3. The document describes the storage of "laboratory quantities" of chemical surety materials at the USAMRICD. The idea presented is that the risk is minimized by keeping the smallest possible amount of CSM on-hand, and ordering more on an as-needed basis. Clearly, a risk is also present in the transport of these materials. Further, it is apparent that a facility exists for storage and dispensing of larger quantities of CSM; however, the location of this facility is not described.

4. Subsection 2.5.1 discusses the "Solid Waste" generated by the USAMRICD. The subsection recites that all nonrecycled solid waste generated by the USAMRICD is disposed in either the Harford Waste-to-Energy plant or the Harford County Sanitary Landfill. Subsequent subsections describe Chemical Surety Materiel (CSM), hazardous waste and radioactive waste generated by the USAMRICD. CSM, hazardous waste and radioactive waste cannot be disposed at either the Harford Waste-to-Energy plant or the Harford Sanitary Landfill. Subsection 2.5.1 should make clear that only nonhazardous solid waste is deposited at the Harford Waste-to-Energy plant and the Harford Sanitary Landfill.

5. In Subsection 2.5.1, although not explicitly stated, it is presumed that the 2,500 pounds of ash was disposed of at the Harford County Sanitary Landfill. To the County's knowledge, ash from APG has been accepted for disposal at the Harford County Sanitary Landfill on only one occasion. On that occasion, the ash had been tested according to RCRA protocols, and MDE had reviewed the test results and approved of the disposal of the ash at the Harford Sanitary Landfill prior to its shipment for disposal. The Harford County Department of Public Works has received a request from the APG Directorate of Safety, Health and the Environment to allow disposal of the ash at the Harford Waste Disposal Center. The information provided is being reviewed, particularly in regard to the frequency of required material characteristic testing. No assumption should be made about the future acceptability of ash for disposal at the Harford County Sanitary Landfill. The County will continue to work with APG in addressing such solid waste disposal issues within the confines of all applicable laws and regulations.

6. Subsection 2.5.2 discusses the disposal of CSM waste, which apparently includes material which may or may not be free of any chemical agent. The first paragraph on page 2-23 states that all CSM wastes generated at the USAMRICD are disposed of at the USACRDEC hazardous waste incinerator. Presumably, this includes the material completely free of chemical agent (5X) referred to in

the first paragraph of page 2-22 and the "solid waste which has the potential for being contaminated with CSM" referred to in the fourth paragraph of page 2-22. In other words, all 1X, 3X, and 5X material is disposed of at the hazardous waste incinerator. Please clarify. The County is very concerned that CSM waste is incinerated at what the County has been told by at least one APG representative is a grandfathered and non-RCRA-permitted incinerator (the USACRDEC incinerator) and thus may utilize inferior and outdated incineration technologies. The County suggests the environmental assessment include information on whether the USACRDEC incinerator is a RCRA permitted incinerator and whether its emissions meet current Clean Air Act and Maryland emissions standards.

7. The USACRDEC hazardous waste incinerator needs to be clearly distinguished from the USAMRICD medical waste incinerator. The ash generated by the USACRDEC incinerator is not addressed in Section 2.5, Waste Stream Management, and needs to be clearly distinguished from the 2,500 pounds of ash from the medical waste incinerator cited in Section 2.5.1 of the report. Please provide information on the disposal practices for the ash from the USACRDEC incinerator. The environmental assessment should make clear that the ash from the USACRDEC incinerator will not be disposed at the Harford Waste-to-Energy plant or the Harford County Sanitary Landfill.

8. Subsection 2.5.2 states, in the last paragraph on page 2-22, that "all toxic and potentially toxic solid waste materials" are wrapped in plastic and stored outdoors until the materials are certified as decontaminated by monitoring of the air within the plastic wrap. This implies that the material is left in storage until any detectable toxic materials in the packaging is released to the atmosphere without environmental controls. Further, if the monitoring can only take place when the ambient temperature is 70 degrees, then toxic material placed in storage may be left unmonitored for several months while waiting for warmer weather. This would appear to be a likely source of releases of toxic material to the environment. Please explain the procedure and rationale.

9. Subsection 2.5.5 states that radioactive wastes "are buried at approved disposal facilities." More information regarding the location of those facilities and the applicable permits and approving agencies should be provided in the assessment. The statement that USAMRICD may optionally perform disposal of low-level radioactive wastes via a sanitary sewer raises some questions. Has this occurred to date, and is this option likely to occur in the foreseeable future? Have the

potential impacts of sanitary sewer disposal of such radioactive wastes been fully evaluated? Concerns such as the disposal of sludge from the wastewater treatment process must be addressed. If additional information is available from other studies, please reference or append the reports.

10. Section 2.10.2 states that "there is no history of recombinant DNA (deoxyribonucleic acid) research at USAMRICD," but goes on to state that two protocols are approved for use of recombinant DNA. Considering the potentially high risk of release of infectious material during the activities related to this topic, the County is concerned about the addition of these activities. The potential impact of the use of these protocols is not addressed by the Environmental Assessment. A detailed discussion of the waste stream management should be included for work with recombinant DNA.

11. In general, the Environmental Assessment considers the USAMRICD facility at Aberdeen Proving Ground as a discrete entity. The presence of other facilities, such as the USACRDEC hazardous waste incinerator and the presumed CSM storage facilities, is at least partially attributable to the existence of the USAMRICD. To fully assess the environmental impact of the USAMRICD operation, the assessment must include the support activities which contribute to the operation.

The County appreciates the opportunity to review and comment on the draft of the Environmental Assessment. I look forward to receipt of any future drafts of the report. I welcome any questions you may have and further suggest that questions regarding specifics should be addressed to Frank Henderson, the County's Deputy Director of Environmental Affairs.

Very truly yours,

Eileen M. Rehrmann

Eileen M. Rehrmann
County Executive

EMR:FRH:JLP
cc: William T. Baker, Jr., P.E.
Frank R. Henderson
Thomas M. Thomas
Emory A. Plitt, Jr., Esquire
Jefferson L. Blomquist, Esquire

DEPARTMENT OF THE ARMY
UNITED STATES ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE
ABERDEEN PROVING GROUND, MARYLAND 21010-5425

December 2, 1992

REPLY TO ATTENTION OF

Research Operations Division

Mr. Frank R. Henderson
Deputy Director of Environmental Affairs
220 South Main Street
Bel Air, Maryland 21014-3865

Dear Mr. Henderson:

I am writing with reference to a letter we received from Eileen Rehrmann, dated November 3, 1992, that concerned the draft Environmental Assessment (EA) for the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD). Although it was received after the period intended for comment, the policy of the U.S. Army Medical Research and Development Command in this matter is to consider late comments on the draft EA to the extent practicable, given the constraints of our internal time frame for its completion.

A number of valid points were raised in the letter that I believe are addressed by the following changes which I have recommended for the EA:

Page	Section	Para	Comment
All	All	All	Replace all instances of "USACRDEC" with "USACBDA".
2-5	2.1	5	First sentence, replace "...the U.S. Army Chemical Research, Development and Engineering Center (USACRDEC)" with "...the U.S. Army Chemical and Biological Defense Agency (USACBDA)"
2-13	2.4.1	7	Following "CSM is received from the USACRDEC Chemical Transfer Facility" add "located at the Edgewood Area of Aberdeen Proving Ground..."
2-21	2.5.1	1	In line 7 change "the Harford County Landfill to "a sanitary landfill". Delete the following two sentences. Add "Only nonhazardous solid waste is

			disposed of at the Harford County Waste-to-Energy Plant."
2-23	2.5.2	7	Replace the sentence, "Off gases (gases which diffuse)..." with "The sealed plastic wrappings provide a head-space internally from which the sample used for determining decontamination status can be drawn."
2-23	2.5.2	8	Change "All CSM waste generated..." to "All surface decontaminated (3X) CSM waste generated..." To the end of this paragraph add, "The USACBDA incinerator operates under a RCRA permit issued in 1985 which is currently under review for renewal by the MDE. USAMRICD provides only 3X (surface decontaminated) waste for burning in the USACBDA incinerator; the burning process reduces this waste to 5X status (completely free of any chemical agent). This ash is then tested by USACBDA for the presence of any additional hazardous constituents. Hazardous ash is disposed of through the Hazardous Waste Tracking System. Non-hazardous ash is disposed of through a solid waste contractor. Ash from this incinerator is distinct from the ash referenced in Section 2.5.1. and is not disposed of at the Harford County Waste-to-Energy Plant nor the Harford County Sanitary Landfill."
2-29	2.5.5	new 4	Add the following as a new fourth paragraph (the draft fourth now becoming fifth): "To date, USAMRICD has not disposed of low level radioactive wastes via the sanitary sewer. The USAMRICD U.S. Nuclear Regulatory Commission (USNRC) license contains a provision that would allow such disposal. Title 10, Code of Federal Regulations, Parts 20.303 and 20.306, also allows the

disposal of these materials within strict limits established in the regulation. The regulation states that the rule, however, does not relieve the licensee from complying with applicable federal, state, or local regulations governing any other toxic or hazardous property of the materials. USAMRICD cannot dispose of these wastes without meeting the strict requirements of the USNRC's regulations and with the concurrence of the APG Installation Directorate of Safety, Health, and the Environment."

2-37 2.10.2	new	As a new last paragraph in the section add: "Infectious organisms are not employed in the recombinant DNA work performed at USAMRICD. Research involving recombinant DNA is strictly controlled through the use of approved SOPs and by strict adherence to National Institutes of Health guidelines. Additionally, any protocol involving recombinant DNA work at USAMRICD must be approved by a biological safety committee. Recombinant DNA work is performed under strict engineering controls (i.e. properly filtered, certified fume hood or biological safety cabinet). There is no special or new waste stream generated by these activities."

The referenced letter also included some comments which, while not requiring modification of the draft EA, I would like to address in this letter.

We agree with the comment in paragraph 1 concerning the necessity for sustained diligence with regard to the protection of the public health and environment in our operations. We address this need through personnel training, the constant refinement of our standing operating procedures (SOP), and command emphasis on our Occupational Safety and Health Program.

The inference in paragraph 5 that 2,500 pounds of ash from the USAMRICD incinerator was disposed of at the Harford County Sanitary Landfill is incorrect. The ash is stored pending approval for disposal in a landfill.

Paragraph 8 questions whether temporary outdoor storage of plastic-wrapped materials that may have been exposed to chemical agents allows the release of toxic substances into the environment. On re-reading the seventh paragraph of subsection 2.5.2 of the draft EA, I found that it could be interpreted to suggest that contaminated items are placed in outdoor storage until they are certified as having been rendered decontaminated through simple off-gassing. This, of course, is not an accurate representation and I have modified the paragraph to convey better the purpose of the procedure. To restate the somewhat complex description in the draft EA: The items placed in our outdoor storage facility consist of materials such as particulate filters and ventilation system ductwork/parts. Although none of the materials stored in this facility are expected to retain chemical agent, we recognize that in use they may have been exposed to chemical agents. This renders them "1X" in our nomenclature, i.e., of undetermined chemical agent content. Consequently, as a cautionary step, we store these materials in sealed, heavy-gauge double plastic wrappings until they are certified as "3X", i.e., surface decontaminated, and transferred to the USACBDA for incineration to "5X" status, i.e., complete absence of chemical agent. The sealed plastic wrappings provide a head-space internally from which the sample used for determining decontamination status can be drawn. During the several years in which we have followed this procedure, we have never found any chemical agent to be present in such testing of these temporarily stored items nor have we found that any deterioration of the protective coverings results from the outside storage configuration.

Regarding a point raised in paragraph 9--the location of the approved disposal facilities in which radioactive wastes are buried--these currently are Barnwell, SC, Hanford, WA, and Beatty, NV. These facilities carry USNRC or state-issued radioactive material licenses.

I appreciate the comments provided in the referenced letter as they have enabled us to improve the clarity of some important aspects of the draft EA. Please feel free to contact me at any time if I may be of help in resolving similar issues.

Sincerely,

Lloyd R. Roberts

Lloyd R. Roberts
Public Affairs Officer

Copies Furnished:
Commander, U.S. Army Medical Research and Development Command,
  Attn: SGRD-SF (Dr. Robert Carton)
Commander, U.S. Army Medical Research and Development Command,
  Attn: SGRD-PA (Mr. Charles Dasey)
Commander, U.S. Army Chemical and Biological Defense Agency,
  Attn: SMCCR-IN (Mr. James Allingham)
Headquarters, U.S. Army Test and Evaluation Command,
  Attn: AMSTE-PA (Mr. John Yaquiant)

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore, Maryland 21224
(410) 631-3000

William Donald Schaefer
Governor

Robert Perciasepe
Secretary

December 2, 1992

Mr. Lloyd R. Roberts
Public Affairs Officer
Research Operations Division
Department of the Army
United States Army Medical Research Institute of Chemical Defense
Aberdeen Proving Ground MD 21010-5425

Dear Mr. Roberts:

Thank you for providing the Maryland Department of the Environment (MDE) with the opportunity to comment on the **Draft Environmental Assessment for the U.S. Army Medical Research Institute of Chemical Defense.** Copies of the documents were circulated throughout the MDE for review, and the following comments are offered for your consideration.

1. Page 2-27: The document states that dedicated liquid waste and holding systems are required for new construction or modifications to existing chemical drains. How are wastes handled under the existing system? Are they pumped directly to the water treatment plant? Is the treatment plant equipped to handle any amount of any waste that would be released from this facility at any time?

2. Page 5-3: Is the Edgewood water treatment plant a closed system, or does it also treat water from the storm sewers? If the system is combined, what, if any safeguards are in place to prevent overflow of untreated sewerage in the event of a severe storm?

Again, thank you for giving MDE the opportunity to review this project. If you have any questions or need additional information, please feel free to call me at (410) 631-3114.

Sincerely,

Susan Scotto

Susan Scotto
Director
Office of Strategic Planning and Policy Coordination

SS:nkb

DEPARTMENT OF THE ARMY

UNITED STATES ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE

ABERDEEN PROVING GROUND, MARYLAND 21010-5425

December 10, 1992

REPLY TO ATTENTION OF

Research Operations Division

Susan Scotto
Director, Office of Strategic Planning and Policy Coordination
Maryland Department of the Environment
2500 Broening Highway
Baltimore, Maryland 21224

Dear Ms. Scotto:

I am writing with reference to your letter dated December 2, 1992, that concerned the draft Environmental Assessment for the U.S. Army Medical Research Institute of Chemical Defense. Although it was received after the period intended for comment, the policy of the U.S. Army Medical Research and Development Command in this matter is to consider late comments on the draft EA to the extent practicable, given the constraints of our internal time frame for its completion.

I believe that para 3 on page 2-25, modified as below, answers your first comment and that the modification to para 1 on page 5-2 responds to your second.

Page	Section	Para	Comment
2-25	2.5.2	3	Move the sentence "Following its containment and analysis, accumulated wastewater..." to the end of the paragraph. Add a new final sentence to the paragraph: "The maximum rate of waste water release is limited by the drain and piping capacity which, in accordance with requirements for hook-up to the water treatment plant, is designed to ensure that the plant's capacity is not exceeded."
5-2	5.2.1	1	Add a new final sentence to the paragraph: "The Edgewood Area Waste Water Treatment Plant is a closed plant and does not receive storm water."

I appreciate your comments as they have enabled us to improve the clarity of the draft EA. Please feel free to contact me at any time if I may be of help in resolving similar issues.

Sincerely,

Lloyd R. Roberts

Lloyd R. Roberts
Public Affairs Officer

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